

Global Inequality and Poverty during the Second Half of the Twenty Century

Zeus Salvador Hernández-Veleros

*Economía, Instituto de Ciencias Económico Administrativas. Universidad
Autónoma del Estado de Hidalgo, México*

Email: zshveleros@yahoo.com

Abstract: This paper takes into account the populations and per capita gross domestic product of 145 different economies in order to analyze global inequality and poverty. We find a slight decrease in some indices of global inequality for the calculations of 1950 and those of 2000 but insufficient to be statistically significant; however, with other inequality and poverty measures we see that they increased during these 51 years.

Keywords: Global Inequality, Poverty, Bootstrap

JEL Classification Number: 015

1. Introduction

Sala-i-Martin (2005) and Holzmann et al. (2007) find a decrease of global inequality and in the poverty during some decades of the second half of the last century. The aim of this paper is to verify these conclusions; so, we estimate different inequality and poverty measures of the real per capita Gross Domestic Product (PCGDP) in 1990 International Geary-Khamis dollars, weighted by population for 145 economies during the second half of the last century. The source of data is Maddison (2003) and we employ Stata modules like ineqerr (with bootstrap estimates of three indices of inequality) and apoverty (it computes a series of poverty measures).

Our hypothesis is that the global inequality of world income distribution and world poverty increased between 1950 and 2000 for 145 economies, despite some economic miracles in countries with great populations.

The organization of this paper is as follows: first, this document outlines the importance to use population in order to analyze the global income convergence and empirical studies about global inequality. In the next section we examine the hypothesis using various measures of global inequality with bootstrap, poverty lines and different poverty measures. Finally, we draw some conclusions.

2. Weighing by Population

Divergence within the cross-economy world income distribution (in which every economy is treated as a single observation) is different from weighted cross-economic distribution (in which income by economy is weighted by its population). Sala-i-Martin (2005) explains that the first approach is the correct one when trying to test theories of economic growth because aggregate growth theories tend to predict that growth depends on national factors. However, if we want to study global welfare, poverty and inequality we must use the second approach, namely, global income convergence analysis.

Holzmann et al. (2007) explain that there are two main approaches used in global income convergence analysis. The first group of papers is based on the classical cross-national income distribution but wherein the observations are weighted by the nations' respective populations. Here the problem is that there is no well-defined way of weighting the observations. Thus, this method allows for the comparison of weight mechanism, but is not well-suited to estimate a global income distribution.

On the other hand, the second group of papers models the global income distribution by taking into account underlying national income distributions with the problem here being to define these distributions. So, Holzmann et al. (2007) model the national income distributions parametrically as normally distributed logs.

There are various standard measures to study the evolution of global income inequality and poverty: Gini coefficient, poverty lines (income thresholds) and poverty rates (the total number of poor divided by the overall population), the Foster-Greer-Thorbecke poverty measure, polarization coefficient, standard deviation of economies' logged income, the Atkinson index and the ratio of the average income of top X percent of distribution to the bottom X percent of distribution.

Sala-i-Martin (2005) reports poverty rates for four poverty lines: rates in 2000 were between one-third and one-half of what they were in 1970 for all four lines, and furthermore, the indexes of income inequality show a reduction during the 1980s and 1990s. He employs per capita GDP-PPP adjusted from Penn World Tables 6.1 (Heston, Summers and Aten (2002)) for 138 countries between 1970 and 2000, and he estimate four poverty lines: \$495 US per year in 1996 prices, \$570 US per year in 1996 prices, \$730 US per year in 1996 prices and \$1,140 US per year in 1996 prices; and he uses eight indexes of income inequality: Gini, Atkinson with an aversion parameter of 0.5, Atkinson with an aversion parameter of 1, variance of log income, the ratio of the income of top 20 centile to bottom 20 centile, the ratio of the income of top 10 centile to bottom 10 centile, the mean logarithmic deviation and Theil index.

Holzmann et al. (2007) show a strong global income convergence accompanied by a drastic decline of global inequality and poverty occurred at 127 countries during the period of 1970 to 2003. These economists use data of per capita GDP PPP from Penn World Table 6.2 (Heston, Summers and Aten, 2006)). They estimate six inequality measures: Gini, Pietra, Atkinson with an aversion parameter of 0.5, Theil's entropy measure, coefficient of variation, Generalized entropy with a parameter of 0.5, and they calculate the next poverty measures: Foster-Greer-Thorbecke poverty measures for the poverty headcount ($\alpha = 0$) and poverty gap ratio ($\alpha = 1$) for \$1 and \$2 per day, absolute number of poor below \$1 per day and absolute number of poor below \$2 per day.

3. Measures of Global Inequality and Poverty

Results of inequality indexes are given in Table 1. The coefficient of Gini weighted by population in 1950 was 0.55 (with a lower boundary equalling 0.45, an upper boundary equalling 0.64 for a 95 percent confidence interval, both calculated using bootstrap with 100 replications) and in 2000, it was 0.54 (with a lower boundary equalling 0.44 and an upper boundary equalling 0.64). The hypothesis established in this paper must be rejected if we just use this indicator.

Table 1: Inequality indexes Weighted by Population using PCGDP for 145 Economies, 1950-2000

Year	Varlogs			Gini			Theil		
	Actual	[95% conf. interval]		Actual	[95% conf. interval]		Actual	[95% conf. interval]	
		(Lower boundary)	(Upper boundary)		(Lower boundary)	(Upper boundary)		(Lower boundary)	(Upper boundary)
1950	0.99	0.60	1.37	0.55	0.45	0.64	0.53	0.32	0.73
1955	0.98	0.62	1.34	0.55	0.46	0.64	0.52	0.34	0.71
1960	0.99	0.60	1.37	0.54	0.45	0.63	0.51	0.33	0.69
1965	1.10	0.73	1.47	0.56	0.48	0.64	0.54	0.35	0.73
1970	1.16	0.78	1.54	0.56	0.46	0.66	0.56	0.34	0.78
1975	1.20	0.82	1.59	0.56	0.48	0.65	0.56	0.36	0.75
1980	1.19	0.84	1.55	0.57	0.47	0.66	0.56	0.35	0.77
1985	1.08	0.61	1.54	0.56	0.48	0.64	0.55	0.37	0.73
1990	1.04	0.55	1.53	0.56	0.48	0.65	0.56	0.39	0.73
1995	0.98	0.40	1.57	0.54	0.45	0.63	0.54	0.39	0.68
2000	0.98	0.41	1.54	0.54	0.44	0.64	0.53	0.37	0.69

However, it must be mentioned that the reduction is minimum, considering the good economic performance of economies with enormous populations during the second half of the 20th century. To the previous calculations we must add respectively to the Theil entropy measure: in 1950 it was 0.53 and in 2000, it was 0.53. On the other hand, the log variances for those years are 0.99 and 98, respectively.

If we define a poverty line of \$1 in 1990 prices per day (pd), then in 1950 we have 9,494,494 people or 0.38 percent of world population; in 2000, we have 51,809,830 people or 0.85 percent of the population. For the poverty line of \$730 per year per year we see an absolute increase between the years 1970 and 2000 (The World Bank 1993 poverty lines are of \$1.08 US per day in 1985 prices and of \$2.15 US per day in 1985 prices. Sala-i-Martin (2005) adjusts \$1.08 US per day in 1985 prices, this corresponds to \$1.35 US per day in 1996 prices; Holzmann *et al.* (2007) adjust \$1.08 US per day in 1993 prices, which one corresponds to \$1.287 US per day in 2000 prices; we don't do that adjust because we don't have more information).

Table 2: Poverty Headcounts (thousands) and Poverty Rates (percent) and using PCGDP for 145 Economies, 1950-2000

Year	1950	1960	1970	1980	1990	2000
Population (th)	2,524,322	3,038,794	3,685,058	4,435,596	5,259,502	6,071,144
Poverty line	Poverty headcounts (thousands)					
\$365 (\$1 pd)	9,494	0	0	4,541	0	51,809
\$730 (\$2 pd)	1,153,143	895,113	204,023	242,978	288,798	263,081
\$1,095 (\$3 pd)	1,406,503	1,620,051	1,750,342	2,091,353	576,554	584,143
\$1,460 (\$4 pd)	1,478,391	1,729,271	2,000,834	2,304,780	1,575,207	895,984
	Poverty rates (percent of world population)					
\$365 (\$1 pd)	0.38	0.00	0.00	0.10	0.00	0.85
\$730 (\$2 pd)	45.68	29.46	5.54	5.48	5.49	4.33
\$1,095 (\$3 pd)	55.72	53.31	47.95	47.15	10.96	9.62
\$1,460 (\$4 pd)	58.57	56.91	54.30	51.96	29.95	14.76

However, if we employ other poverty measures like a poverty line set at 1/2 of the median value of the PCGDP, Thon index, Sen index, Takayama index, Watts index, Foster-Greer-Thorbecke index with different ethical parameters, Clark, Hemming, and Ulph index, all weighted by population, we see that poverty increases during these 51 years. For example, in 1950 the extreme poverty headcount ratio percent is 0.00, in the year 2000 it is 5.56 percent of the world population. The poverty headcount ratio percent in 1950 is 2.00; in 2000 it is 14.88 percent (Table 3).

Table 3: Poverty Indexes Weighted by Population using PCGDP for 145 Economies, 1950-2000

Year	Pov. headc. ratio %	Extr. pov. Headc. Ratio %	Aggreg. pov. Gap	Per capita pov. gap	Pov. gap ratio %	Income Gap Ratio %	Index Watts	FGT index () *100				
								(0.5)	(1.5)	(2.0)	(2.5)	(3.0)
1950	2.00	0.00	1.97.E+09	0.78	0.19	9.30	0.20	0.59	0.07	0.03	0.01	0.01
1955	2.31	0.00	3.77.E+09	1.36	0.28	11.94	0.30	0.77	0.11	0.05	0.02	0.01
1960	1.57	0.00	3.39.E+09	1.12	0.22	14.00	0.24	0.58	0.09	0.03	0.01	0.01
1965	0.69	0.00	8.61.E+08	0.26	0.05	7.58	0.06	0.15	0.02	0.01	0.00	0.00
1970	1.81	0.00	2.34.E+09	0.63	0.11	5.87	0.12	0.37	0.04	0.02	0.01	0.00
1975	5.14	0.00	2.48.E+10	6.09	0.87	16.90	0.97	2.06	0.38	0.17	0.08	0.04
1980	2.90	0.00	7.74.E+09	1.75	0.29	9.88	0.31	0.87	0.10	0.04	0.02	0.01
1985	5.72	0.00	4.73.E+10	9.80	1.29	22.53	1.48	2.67	0.64	0.32	0.16	0.08
1990	8.51	0.12	1.19.E+11	22.61	2.43	28.60	2.99	4.42	1.39	0.82	0.49	0.30
1995	13.69	3.83	3.97.E+11	70.02	5.28	38.57	7.51	8.16	3.61	2.58	1.89	1.42
2000	14.88	5.56	7.25.E+11	119.45	6.97	46.87	10.64	9.98	5.05	3.77	2.90	2.28
Year	FGT index () *100				Clark et al. index () *100					Thon *100	Sen *100	Takayama *100
	(3.5)	(4.0)	(4.5)	(5.0)	(0.10)	(0.25)	(0.50)	(0.75)	(0.90)			
1950	0.00	0.00	0.00	0.00	0.20	0.20	0.19	0.19	0.19	0.37	0.24	0.18
1955	0.00	0.00	0.00	0.00	0.30	0.30	0.29	0.28	0.28	0.55	0.36	0.27
1960	0.00	0.00	0.00	0.00	0.24	0.23	0.23	0.22	0.22	0.44	0.25	0.22
1965	0.00	0.00	0.00	0.00	0.06	0.06	0.05	0.05	0.05	0.10	0.08	0.05
1970	0.00	0.00	0.00	0.00	0.12	0.11	0.11	0.11	0.11	0.21	0.17	0.11
1975	0.02	0.01	0.00	0.00	0.96	0.94	0.92	0.89	0.88	1.70	1.07	0.84
1980	0.01	0.00	0.00	0.00	0.31	0.31	0.30	0.29	0.29	0.57	0.36	0.28
1985	0.04	0.02	0.01	0.01	1.46	1.43	1.38	1.33	1.31	2.51	1.49	1.24
1990	0.18	0.12	0.07	0.05	2.92	2.83	2.69	2.56	2.48	4.71	3.01	2.33
1995	1.09	0.84	0.66	0.53	7.22	6.82	6.23	5.72	5.45	10.05	6.83	5.03
2000	1.82	1.49	1.23	1.04	10.13	9.44	8.46	7.65	7.23	13.13	8.52	6.63

4. Conclusions

We do not find a significant statistical reduction in the global inequality. Different poverty lines indicate a diminution in poverty (only for the poverty line of \$1 per day we can see an absolute increase in people and also a relative increase during these 51 years) but with other measures we see that it increased during the second half of the last century. These situations are arriving regardless of the growth rates of enormous economies like China and India with almost 37 percent of the world population.

References

Holzmann, H., S. Vollmer and J. Weisbrot, 2007, Perspectives on the World Income Distribution –Beyond Twin Peaks Towards Welfare Conclusions, <http://opus.zbw-kiel.de/volltexte/2007/6555/pdf/Vollmer.pdf>, accessed 3 June 2010.

Maddison, A., 2003, The World Economy: Historical Statistics, Paris, Organisation for Economic Co-operation and Development.

Sala-i-Martin, X., 2005, The World Distribution of Income: Falling Poverty, and Convergence Period, http://www.columbia.edu/~xs23/papers/pdfs/World_Income_Distribution_QJE.pdf, Accessed 10 May 2010.