



Munich Personal RePEc Archive

The Real Bottom Line: Benchmarking Performance in Poverty Reduction in Latin America and the Caribbean

Newman, John L. and Azevedo, João Pedro and Saavedra,
Jaime and Molina, Ezequiel

World Bank, World Bank, World Bank, PhD candidate, Princeton
University

November 2008

Online at <https://mpra.ub.uni-muenchen.de/85585/>
MPRA Paper No. 85585, posted 30 Mar 2018 16:20 UTC

The Real Bottom Line: Benchmarking Performance in Poverty Reduction in Latin America and the Caribbean[☆]

John L. Newman^{*,a}, João Pedro Azevedo^{*,b}, Jaime Saavedra^c, Ezequiel Molina^d

^a*SASEP*

^b*LCSP*

^c*PRMPR*

^d*PhD candidate, Princeton University*

Abstract

This paper makes two contributions. First, it carries out an extensive analysis of episodes of poverty changes and documents the empirical distribution of poverty changes. This is useful for providing some context for assessing whether observed changes in poverty that a country may achieve are good, bad or indifferent and for guiding goals that might be set for poverty reduction. Second, the paper proposes and illustrates an approach to take account of country observable characteristics in assessing what constitutes good and poor performance for a specific country. The approach consists of comparing a country's actual performance to counterfactual distributions generated using quantile regressions. The paper considers four cases where the type of benchmarking approach being proposed helps facilitate a policy dialogue.

Key words:

Poverty Reduction, Benchmarking, Millennium Development Goals, Economic Growth, Quantile Regression, Latin America and the Caribbean

First version: November, 2008

This version: April, 2010

1. Introduction

For a society and the global community, one can make a strong case that what really matters - the real bottom line - is how well countries do in reducing poverty. The intense scrutiny of politicians, the media and the general public to the release of new data on poverty in a country illustrates how important making

[☆]The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development, World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent. The authors would like to thank Carolina Sanchez-Paramo, Kenneth Simler, Naércio Menezes-Filho, seminar, Hugo Nopo and participants from the poverty session at the 13th LACEA Meeting, the IBMEC-São Paulo Economics Department Seminar Series and the World Bank's LAC Poverty and Gender Unit and Poverty Anchor Seminars. The usual disclaimer applies.

*Corresponding author

Email addresses: jnewman@worldbank.org (John L. Newman), jazevedo@worldbank.org (João Pedro Azevedo)

progress on poverty is to whether a government or a country is judged to be successful. However, while there is intense attention paid to the change in the poverty measure within the country, there is a surprising lack of attention paid to putting the change in context. Is a given change, good, bad or indifferent? Without a good frame of reference, expectations on performance held by the media and the public could in some cases be unrealistically high and in other cases not be sufficiently demanding on the government and society. These expectations on performance can have real effects on outcomes - through the pressure exerted on government policies or, indeed, on the pressure exerted on the very survival of a government.

This paper adopts the perspective of a particular country that has experienced some absolute change in poverty in the past or would like to set a goal for poverty reduction in the future and goes through the steps that might help put that actual or desired change in context¹. Section 2 describes the data. Section 3 presents the empirical distribution of episodes of poverty change for over 85 countries over the last 25 years, using all readily available data in the public domain. Section 4 describes how quantile regressions can be used to control for whatever observable characteristics the interested observer may want to take into account in putting past performance and future goals in perspective. In contrast to an Ordinary Least Squares (OLS) regression that estimates the relation at the mean of the distribution, quantile regression can estimate the relation at the median, the 25th percentile or, indeed, at any given percentile (Koenker and Bassett, 1978; Koenker, 2005). Just as the estimated coefficients from an OLS regression might be combined with values of the country characteristics to yield a predicted mean value of the change in poverty, the estimated coefficients from each one of the 99 quantile regressions are combined with the given country characteristics to yield predicted percentiles of the distribution of poverty changes.

Section 5 illustrates the potential usefulness of the approach, using different cases to address four different questions. The first case is that of Andean countries in the late 1990s and early 21st century. Over that time, there had been considerable public dissatisfaction with the pace of poverty reduction and considerable political turmoil. The question addressed is whether the pace of poverty reduction was much below average performance from what might be expected given their overall economic conditions. If so, then the dissatisfaction and political turmoil should not be at all surprising.

The second case is that of a specific Andean country - Peru - at a slightly later period. From 2003 to 2006, Peru experienced reasonably strong growth that was not matched by an equally strong absolute change in poverty. Then, in May 2008, the Government of Peru announced that poverty fell by 5.2 percentage points between 2006 and 2007. This announcement was greeted with some skepticism. Was that result too good to be true?

¹While recognizing that poverty is a multidimensional concept, the benchmarking exercise is carried out with poverty measured as either consumption or income. Similar exercises could be done with any related indicator, provided it is quantifiable and provided there are sufficient observations across countries or any other subnational units.

The third case looks at the goals that a country may set for itself. Since the beginning of 2008, the Dominican Republic has been actively engaged in a planning exercise - laying out a vision for the next 20 years, setting goals and re-orienting policies to reach those goals². One of the most important goals being set is for the reduction of poverty. How should the Dominican Republic decide what goal to set?

The fourth case involves the most highly visible goal-setting exercise in development - that of the Millennium Development Goals. In the case of Africa, William Easterly has argued that the Millennium Development Goals assumed unrealistic improvements in poverty reduction and that African countries were set up for failure (Easterly, 2007). In the case of Latin America and the Caribbean, it was argued that the task of meeting the MDGs was less demanding. Does achieving the poverty MDG require more of a performance improvement for Africa than it does for Latin America?

In all four cases, uncertainty and concern over what has been, what should be and what is likely to be the pace of poverty reduction arises because there is not widespread knowledge about what constitutes good and poor performance in poverty reduction for a particular country. While there are quite a few articles that look at how trends in poverty have evolved worldwide or in a region³, the work on benchmarking the performance of countries is just beginning⁴.

2. The Data

The poverty data for this analysis was obtained using POVCALNET, a publically available software tool to access international poverty data, available on the World Bank's external web site (<http://iresearch.worldbank.org/PovcalNE>). The project of constructing an international poverty data set based on household survey data was started by Chen and Ravallion in 1989, and the first estimates were published in the 1990 World Development Report: Poverty. The database has been updated in October 2008 and now presents comparable poverty data that takes into account the 2005 international price data provided by the International Comparison Program (ICP).⁵

²Several Latin American countries are engaging in exercises in which targets are set up in order to guide public policy as part of Government Plans, National Development Plans or as quantitative promises to its electorate. These include Mexico, with its Presidential Goals and the Strategic Objectives of Social Development 2007-20012; Colombia, with its Vision 2021 and its tetra-annual Development plans which set quantitative goals at the beginning of each period; and Peru with the quantitative goals for the rest of his Presidency set out by President Alan Garcia of Peru in his second Annual National Address in 2007. The practice of goal setting has also been adopted at a state level. The Government of Minas Gerais, as part of its Plano Mineiro de Desenvolvimento Integrado, set quantitative targets for the period 2007-2011, and explicitly linked those targets to inputs, policies and programs needed to accomplish those targets. Finally, there is a strong emphasis on the achievement of goals in the approach to development assistance of the US government's Millennium Challenge Corporation.

³A summary of the results from the latest assessment of worldwide trends can be found in two recent working papers ,Ravallion et al. (2008) and Chen and Ravallion (2008).

⁴The 2007 World Development Indicators publication presents for the first time indicators of poverty performance for some select individual countries. The 2007 World Development Indicators defines performance as the difference between the actual rate of change and the average rate of change of countries starting from similar positions in poverty rates or per capita incomes. It then identifies 41 countries that have more than 10 years of data on poverty and rates their performance.

⁵POVCALNET makes use of over 500 socio-economic surveys spanning over 100 countries. Because of sparse data availability for some countries, only 90 countries were included in this analysis.

Table 1: Total Number of Episodes of Poverty Change by Country for LAC and Rest of the World

Number of Episodes	Region					
	LAC		Rest of the World		Total	
	No.	%	No.	%	No.	%
2	2	1.61	26	7.76	28	6.10
3	0	0.00	48	14.33	48	10.46
4	4	3.23	72	21.49	76	16.56
5	15	12.10	45	13.43	60	13.07
6	36	29.03	72	21.49	108	23.53
7	49	39.52	56	16.72	105	22.88
8	0	0.00	16	4.78	16	3.49
9	18	14.52	0	0.00	18	3.92
Total	124	100.00	335	100.00	459	100.00

Source: PovCalNet .

Universe: Selected countries with at least two observations on a poverty change over at least five years.

PovcalNet allows one to calculate the proportions that are poor under different assumptions of the international poverty line. To convert these international poverty lines into local currencies, POVCALNET uses Purchasing Power Parity (PPP) exchange rates for consumption that reflect the differences in the prices of goods and services across countries.⁶

For the purposes of this paper, the analysis uses all poverty data between 1985 and 2007 that were output from the version of POVCALNET that was on line on October 17, 2008⁷. Using all available data, it was possible to calculate a total of 124 discrete poverty changes for 20 countries from Latin America and the Caribbean and 335 discrete poverty changes for 64 countries from the rest of the world, yielding a total of 459 discrete poverty changes for 84 countries⁸.

Tables 1 and 2 provide some information on the nature of the measured changes. Table 1 presents the distribution of the number of episodes per country. The table indicates that there are 20 countries in LAC and 64 countries in the rest of the world that provide two or more observations on the rate of change. Table 2 presents information on the distribution of number of years between the initial and end points of a poverty change episode. In LAC, in 90 percent of the episodes the gap between the initial and end point is four years or less. In the rest of the world, in 85 percent of the episodes the gap between the initial and end point is also less than four years.

⁶See Reddy and Pogge (2002); Ravallion (2002); Ackland et al. (2007); Reddy and Pogge (2003) for a discussion of the issues related to using PPP calculations to compare poverty results across countries. Since the surveys do not all line up conveniently in time, one also needs a method of interpolating to non-survey years. National accounts data and census-based estimates of the population of each country at each date are used to aid in the interpolation.

⁷an earlier version of this paper was written using the data from May 1st 2008, that was based on 1993 price data that was projected forward. The results are qualitatively the same, and a copy is available upon request.

⁸For Latin America there are some observations only for urban areas in Uruguay and Argentina. These are treated as separate observations. In the case of Bolivia there was a single observation of Urban-Bolivia and for Uruguay there as a single observation for the country as a whole, both observations were dropped from the analysis by the above mentioned selection criteria for the analysis.

Table 2: Years Between Poverty Observation for LAC and Rest of the World

Number of years	Region					
	LAC		Rest of the World		Total	
	No.	%	No.	%	No.	%
1	8	7.69	12	4.67	20	5.54
2	39	37.50	48	18.68	87	24.10
3	30	28.85	74	28.79	104	28.81
4	15	14.42	37	14.40	52	14.40
5	5	4.81	36	14.01	41	11.36
6	4	3.85	17	6.61	21	5.82
7	2	1.92	16	6.23	18	4.99
8	0	0.00	6	2.33	6	1.66
9	1	0.96	3	1.17	4	1.11
10	0	0.00	4	1.56	4	1.11
11	0	0.00	3	1.17	3	0.83
14	0	0.00	1	0.39	1	0.28
Total	104	100.00	257	100.00	361	100.00

Source: PovCalNet .

Universe: Selected countries with at least two observations on a poverty change over at least five years.

3. Empirical Distribution of Poverty Changes

While the POVCALNET data has been used extensively to analyze the level of poverty, less attention has been paid to the change in poverty. In this section we examine the distribution of episodes of poverty change, combining all observations on changes in poverty that can be accessed from readily available internationally comparable data sets. We depict the distribution in both figures and tables.

Figure 1, the central figure in the paper, presents the distribution of changes using the \$3 a day international PPP poverty line and uses all recorded changes in poverty⁹. For illustrative purposes, a few episodes of poverty changes are highlighted on Figure 1. Mexico between 2002 and 2004 had one of the best recorded episodes of poverty reduction, while India between 2004 and 2006 and Brazil between 2002 and 2005 had very similar experiences, both having a performance around the 60th percentile. That is, their performance in reducing poverty was better than roughly 60 percent of all observed poverty changes.

Table 3 presents the values of the absolute change at different percentiles for the different \$ a day international PPP poverty lines. It is apparent that for countries in Latin America and the Caribbean, there are not many differences in the percentiles for \$3 or \$4 a day, but the values for \$1 and \$2 a day exhibit quite a distinct pattern. In most of what follows, the paper focuses on analyzing the changes in poverty using the \$3 a day international PPP poverty line as it is more appropriate for Latin American countries than the \$1.25 or \$2 a day figures that are often used for international comparisons.

It is also apparent that the extremes in poverty changes are more pronounced in Latin America from those of the rest of the world. At the low end of the distribution (the 20th percentile), poverty has increased more sharply in Latin American countries and at the high end of the distribution (the 80th percentile), poverty declines more rapidly than in the rest of the world.

⁹Appendix A carries out a number of robustness checks to determine whether performing any of these additional modifications would affect the distribution of average annual changes in poverty. We test for equality of distributions and, in virtually all the robustness checks, one cannot reject the hypothesis that the data are drawn from the same distribution.

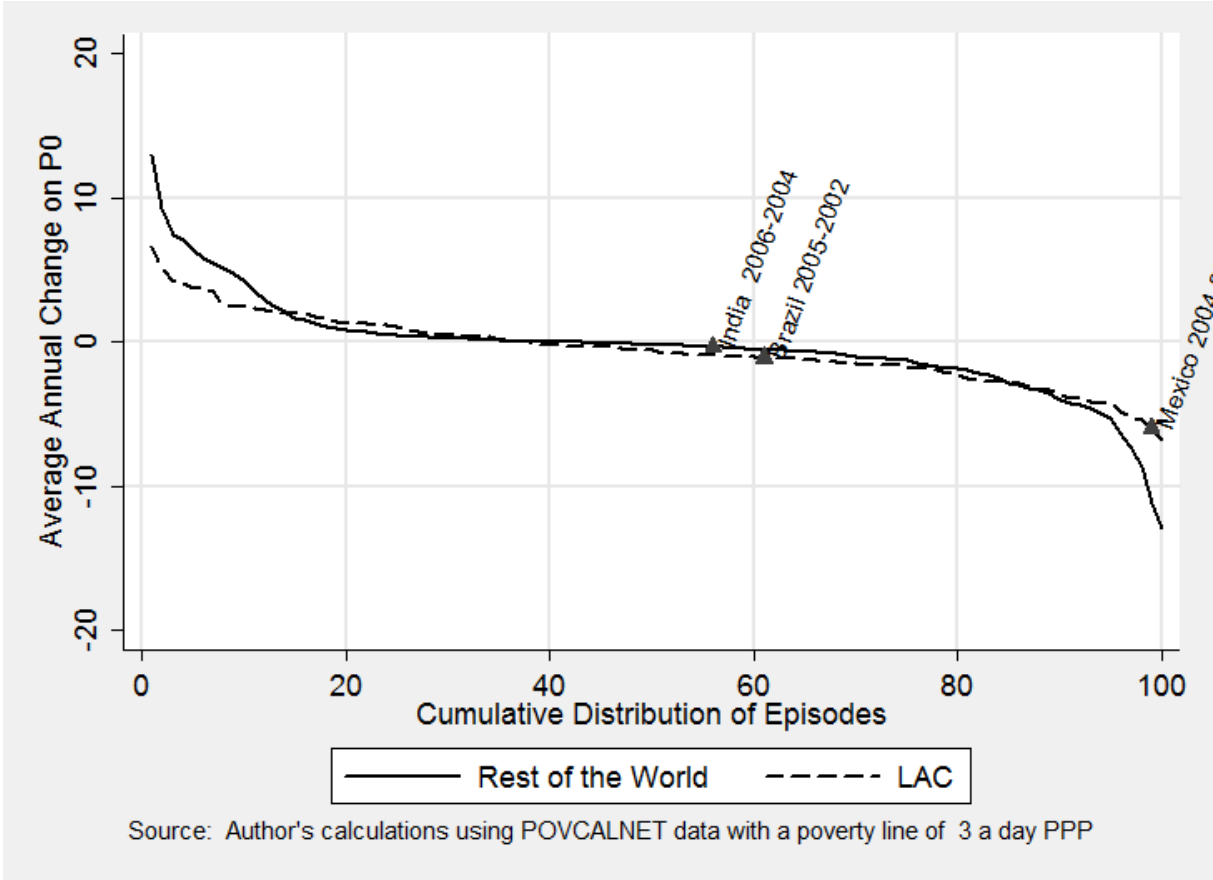


Figure 1: Empirical Distribution of the Average Annual Poverty change using US\$ 3 PPP poverty line

Table 3: Average Annual Change by Poverty Line, Percentile and Region of the World

PPP Poverty Line	20 th	40 th	60 th	80 th
LAC				
1	0.888	0.022	-0.543	-1.295
2	1.350	0.157	-0.946	-1.835
3	1.287	-0.244	-1.158	-2.700
4	1.707	-0.204	-1.172	-2.775
5	1.523	-0.198	-1.020	-2.650
Rest of the World				
1	0.446	0.000	-0.533	-1.732
2	0.821	0.000	-0.575	-2.091
3	0.822	-0.022	-0.486	-1.848
4	0.855	-0.007	-0.334	-1.723
5	0.892	0.000	-0.231	-1.408
World				
1	0.544	0.000	-0.539	-1.549
2	0.974	0.000	-0.699	-2.075
3	1.092	-0.031	-0.616	-2.004
4	1.075	-0.021	-0.541	-2.050
5	1.088	-0.010	-0.415	-1.618

Source: author's calculation based on PovCalNet.

Figure 2 illustrates how the distribution of changes in poverty have varied over the last three decades. One can observe that the experience over the first part of the 2000s is significantly better than the experience in the decades of the 80s and 90s.

The next poverty numbers that will become available will reflect the impact of the worldwide recession. While there have been several exercises to estimate the likely impact of the recession on poverty based on estimated elasticities, it is worth noting that, historically, there has been a considerable variation in poverty changes even with per capita declines. Of course, there is a considerable difference in the distribution of poverty changes when per capita GDP growth as compared with the situation when it increases (see Table 4). However, there are still instances where measured poverty declined when per capita GDP fell. In 20 percent of the cases, the increase in poverty has been quite significant - over 2.4 percent when poverty is measured using a \$3 a day international PPP poverty line. However, this relation is not automatic. The evidence shows that even when per capita GDP rates fall, there are around 20 percent of the observed cases where poverty decreases by over 1.5 percentage points a year.¹⁰

4. Controlling for Country Characteristics

The above analysis of episodes of poverty changes looked simply at the unconditional empirical distribution of poverty changes. However, a government or an interested observer in a country may wish to define some specific country characteristics to control for in order to generate a comparison that they consider more relevant than a comparison to all countries over all observable periods. If there were many more observations than what is currently available, one might form a comparator group by selecting some countries to be included in the comparator group, dropping others. However, constructing a comparison group by dropping observations is not efficient and would greatly reduce the sample size. Instead, it is possible to retain all observations and carry out some multivariate statistical analysis to take into account differences in country characteristics.

Our approach to controlling for differences in country characteristics is to use quantile regressions to estimate the relation between the average annual poverty change and a set of country characteristics. We

¹⁰Figure 17 in Annex D shows that there is not a dramatic tendency to have larger increases in poverty with more intense declines in per capita GDP.

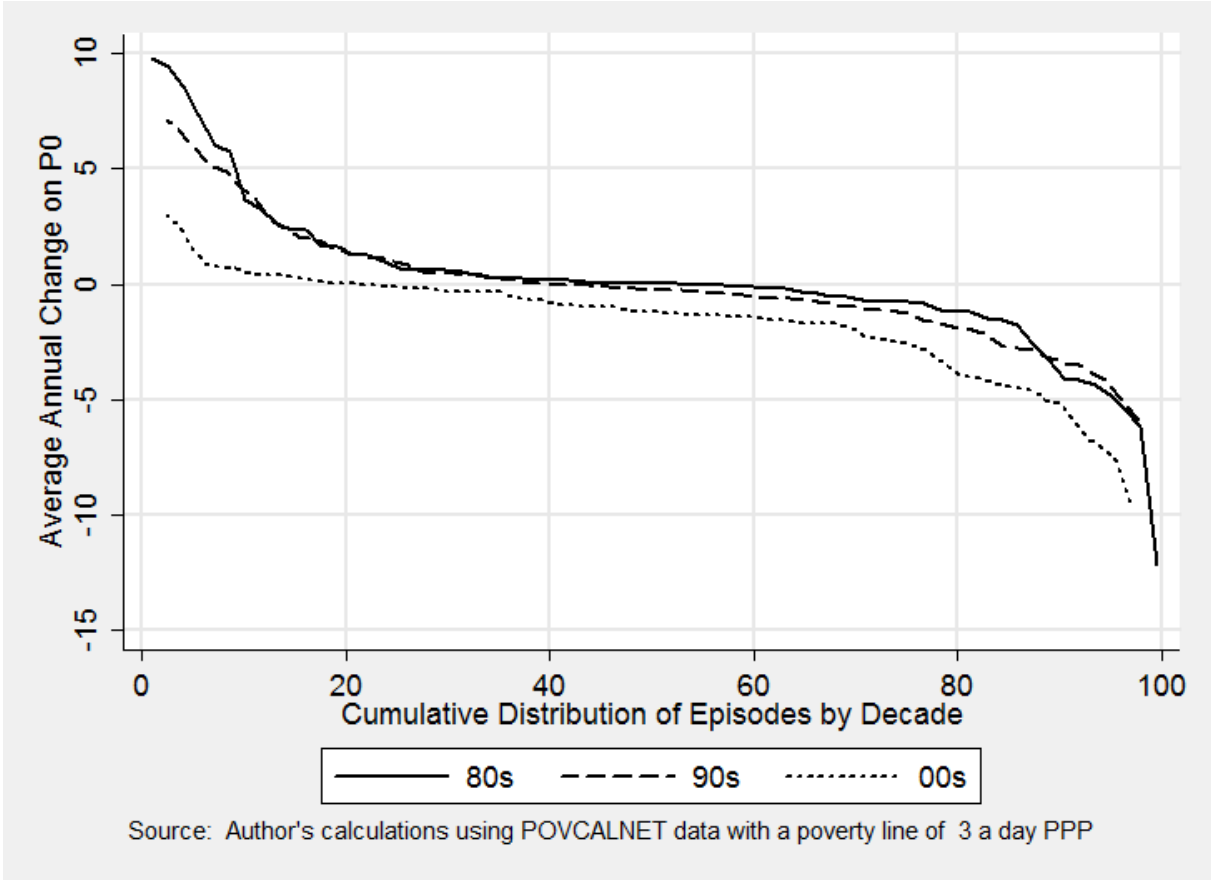


Figure 2: Empirical Distribution of the Average Annual Poverty change using US\$ 3 PPP poverty line by Decade

Table 4: Average Annual Change by Poverty Line, Percentile and Economic Activity

PPP Poverty Line	20 th	40 th	60 th	80 th
Periods of negative GDP per capita growth rates				
1	0.888	0.213	-0.093	-0.693
2	2.095	0.545	0.000	-1.297
3	2.443	0.575	0.014	-1.640
4	3.465	0.870	-0.037	-1.630
5	3.750	0.930	-0.036	-1.443
Periods of positive GDP per capita growth rates				
1	0.324	-0.071	-0.616	-1.672
2	0.548	-0.109	-0.848	-2.216
3	0.580	-0.177	-0.680	-2.238
4	0.652	-0.076	-0.641	-2.115
5	0.638	-0.059	-0.493	-1.759

Source: author's calculation based on PovCalNet.

believe that for the purpose at hand, that of considering what constitutes good and poor performance for a particular country, an estimation approach based on quantile regressions has decided advantages over OLS regressions. An OLS regression estimates the relation at the mean of the distribution. However, a benchmarking exercise is not about performance at the mean of a distribution. It is about performance that is considerably better or worse than average. Using quantile regressions allows one to estimate the relation between average annual changes in poverty and country characteristics at different percentiles in the distribution. In the analysis carried out in this paper, we estimate 99 different quantile regressions, corresponding to percentiles 1 through 99. This generates 99 sets of coefficients, which when combined with a particular country's set of characteristics, yields a set of 99 predicted percentiles. When controlling for country characteristics, the observed annual change can be compared with a counterfactual distribution of predicted percentiles that is specific to each country. We used a Taylor series expansion to calculate the 95% confidence interval of the predicted values used in all exercises. This technique is sometimes called the delta method (Oehlert, 1992).

The final consideration is the choice of the country characteristics. Again, the idea is not to explain the change in poverty, but to generate a standard for comparing performance that could be more relevant for the country in question. Each government or interested party could pick the specific country characteristics that it would like to control for in the comparison. The only requirement is that the characteristic be observable and that data exist for the countries in the sample. The paper presents results for three specifications, selected to be similar to those specifications used in the calculation of poverty elasticities as in Adams (2004) or Ravallion (1995).

The first and simplest specification is to condition only on the initial value of poverty at the beginning of the observed change. One might expect that it is easier for a country to achieve a given annual change in poverty, when, at the beginning of the period, poverty is higher.

The second specification incorporates some measures of observable variables related to the overall socio-economic and socio-demographic characteristics of the country. These values are measured at the initial point of the episode of the poverty change. For example, one might expect that when the age-dependency ratio is higher, that it is harder to bring about a reduction in poverty.

The third specification adds the average annual GDP growth that occurred over the episode corresponding to the poverty change to the list of country characteristics measured at the initial point of the episode.

Table 5 present the estimated coefficients for selected quantile regressions for the three different specifications.

Table 5: Coefficients of Selected Quantile Regressions (Dependent variable: Average annual change of the poverty rate $_{(t,t+1)}$)

Variable	q10	q30	q50	q70	q90
Specification 1					
3 dollars per day poverty line (PPP) $_{(t)}$	-0.024*	-0.011	-0.006**	-0.010**	-0.063**
	(0.011)	(0.007)	(0.001)	(0.004)	(0.011)
Constant	-2.549**	-0.728*	-0.000	0.925**	6.516**
	(0.609)	(0.300)	(0.077)	(0.316)	(0.948)
Observations	358	358	358	358	358
Specification 2					
3 dollars per day poverty line (PPP) $_{(t)}$	-0.050 [†]	-0.028	-0.024 [†]	-0.056**	-0.083**
	(0.028)	(0.018)	(0.012)	(0.015)	(0.011)
Gini Index $_{(t)}$	0.025	-0.025	-0.017	-0.013	-0.021
	(0.047)	(0.021)	(0.011)	(0.012)	(0.022)
GDP per capita, PPP (constant 2005 international thousands \$) $_{(t)}$	-0.355	-0.206	-0.164	-0.437**	-0.528**
	(0.280)	(0.181)	(0.114)	(0.134)	(0.127)
Constant	-0.798	2.206	2.451 [†]	6.247**	10.143**
	(3.057)	(2.031)	(1.427)	(1.902)	(1.448)
Observations	346	346	346	346	346
Specification 3					
3 dollars per day poverty line (PPP) $_{(t)}$	-0.093**	-0.051**	-0.032**	-0.041**	-0.076**
	(0.025)	(0.017)	(0.011)	(0.014)	(0.018)
Gini Index $_{(t)}$	-0.069	-0.016	-0.015	-0.024	-0.025
	(0.048)	(0.023)	(0.012)	(0.015)	(0.033)
Rural population (% of total population) $_{(t)}$	0.058*	0.036*	0.019 [†]	0.008	0.002
	(0.030)	(0.014)	(0.010)	(0.015)	(0.027)
Age dependency ratio (dependents to working-age population) $_{(t)}$	8.088**	3.463*	1.073	-0.134	-1.951
	(2.589)	(1.499)	(0.932)	(1.221)	(2.375)
GDP per capita, PPP (constant 2005 international thousands \$) $_{(t)}$	-0.294	-0.132	-0.107	-0.281 [†]	-0.567**
	(0.253)	(0.123)	(0.097)	(0.150)	(0.132)
Contemporeneous GDP pc Growth $_{(t)}$	-13.209	-13.014*	-18.421**	-22.161**	-26.297*
	(13.758)	(5.326)	(3.982)	(5.278)	(12.015)
Constant	-2.789	-1.221	1.149	5.117*	12.126**
	(3.373)	(1.791)	(1.572)	(2.306)	(2.452)
Observations	345	345	345	345	345

Statistical Significance : [†] : 10% * : 5% ** : 1%

Note: 3 USD per day (PPP); PovCalNet data 1985-2006; Standard errors bootstrapped (400 reps)

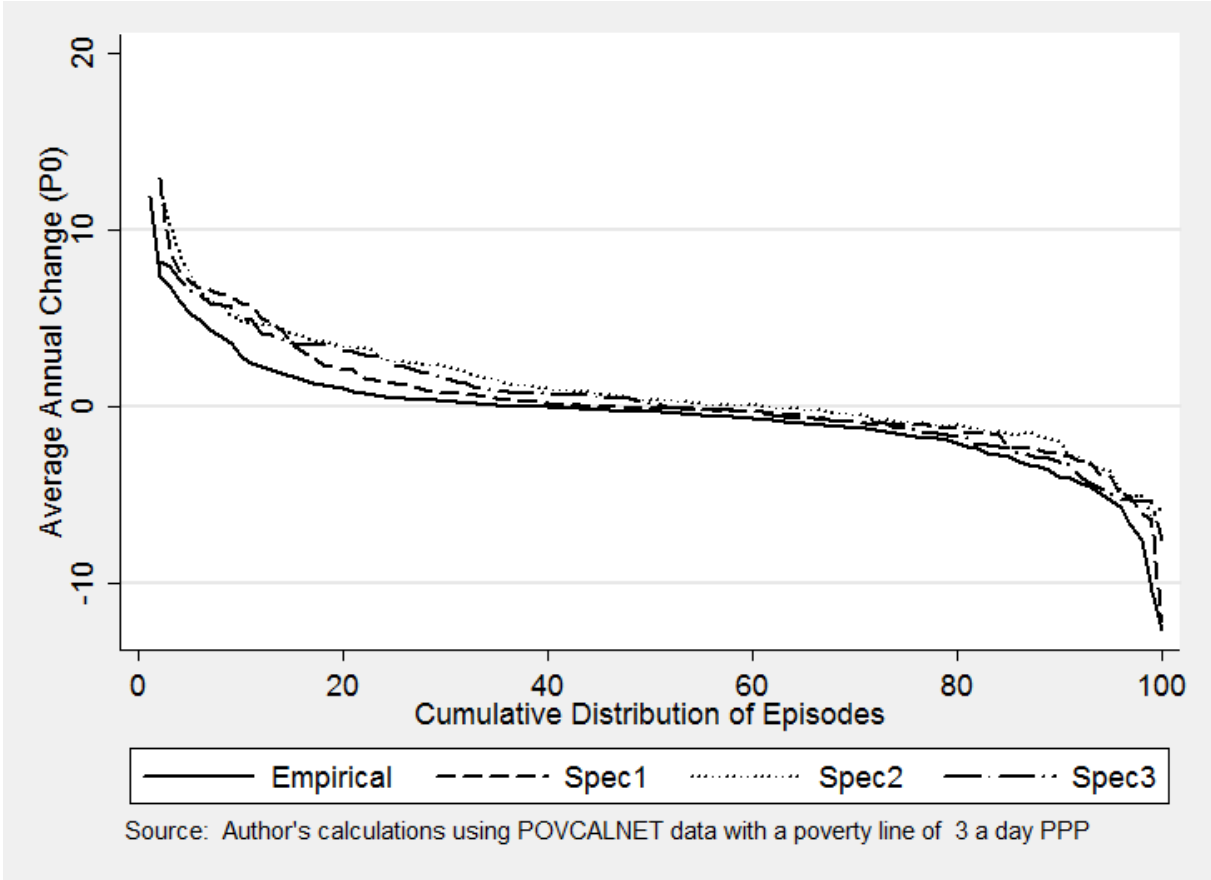


Figure 3: Mexico - Empirical and counterfactual distributions using three specifications

While for each specification, there were 99 quantile regressions, in the interest of brevity, only a few of the results for the different percentiles are presented. Figures ??, ??, and ?? in Annex B illustrate how the values of the estimated coefficients vary across the different percentiles.

Figure 3 illustrates for a particular country - Mexico - how the counterfactual distributions vary with differences in the specifications. For an observed average annual poverty change of -4.0, Mexico would be in the 90th, 85th and 80th percentile, depending on which specification was chosen. Because including different country characteristics correspond to making different comparisons, there is no reason why the results would have to be the same.

5. Empirical analysis and policy implications

We turn now to the four cases identified in the introduction and illustrate how the questions posed in each case can be addressed through applications of the approach described in this paper.

5.1. *The Andean countries*

The introduction posed the question - was the pace of poverty reduction in the Andean countries much below average performance from what might be expected given their overall economic conditions. Table 6 indicates that the answer, for the most part, is yes. Between 1997 and 1999, only 13 percent of the poverty changes in the sample were worse than what Bolivia experienced and, controlling for Bolivia's characteristics, only 5 percent were worse. This increase in poverty occurred at a time when real GDP fell by 1.6 percent between 1998 and 1999. There is no national data on poverty at the beginning of the decade, but the low growth rate of 2 percent between 1990 and 1998 suggests that the increase in poverty was coming on top of a period when poverty probably did not decrease significantly. The situation in subsequent years improved somewhat, but by then there was already considerable unrest in Bolivia. And the improved performance in later years did not compensate for the very large increase between 1997 and 1999. It is not surprising that there was such a high level of social and political unrest.

In Peru, the situation was a bit better, but not much better. Between 1994 and 1996 and between 1996 and 2002, the performance of Peru in poverty reduction was in the lower part of the distribution of all observed changes in poverty. It is only in the last period, between 2002 and 2005, that the poverty situation has turned around.

The performance in Ecuador was slightly better than average - good between 1998 and 2003 and average in the other two periods.

Table 6: Relative Position of Andean Countries on the Empirical and Conditional Distribution of Episodes of Poverty Reduction in the 1990s and early 2000s:

Country	Period	Avg. Absolute Change	Relative Position		95% Confidence Interval* Conditional	
			Empirical	Conditional ⁺	Lower Boundary	Upper Boundary
One Dollar a Day Poverty Line (PPP)						
Bolivia	1997-1999	2.880	13.0	5.0	3.0	8.0
Bolivia	1999-2002	-0.630	73.0	55.0	45.0	61.0
Bolivia	2002-2005	-1.063	81.0	69.0	64.0	79.0
Ecuador	1994-1998	-0.237	52.0	41.0	34.0	48.0
Ecuador	1998-2003	-0.886	79.0	74.0	69.0	80.0
Ecuador	2003-2005	-0.355	56.0	59.0	55.0	65.0
Peru	1994-1996	1.425	19.0	11.0	8.0	15.0
Peru	1996-2002	0.660	26.0	19.0	13.0	23.0
Peru	2002-2005	-1.457	88.0	87.0	83.0	90.0
Three Dollars a Day Poverty Line (PPP)						
Bolivia	1997-1999	2.465	12.0	14.0	10.0	18.0
Bolivia	1999-2002	-0.237	48.0	47.0	41.0	55.0
Bolivia	2002-2005	-1.410	73.0	72.0	68.0	78.0
Ecuador	1994-1998	-0.285	50.0	51.0	43.0	57.0
Ecuador	1998-2003	-0.778	63.0	63.0	59.0	69.0
Ecuador	2003-2005	-2.270	82.0	84.0	79.0	86.0
Peru	1994-1996	1.805	15.0	19.0	14.0	23.0
Peru	1996-2002	0.435	27.0	32.0	23.0	37.0
Peru	2002-2005	-1.720	77.0	78.0	74.0	83.0

Source: Author's calculation; (*) Bootstrapped CI with 400 replications; (+) Conditional distribution constructed controlling only for poverty at beginning of period.

5.2. Peru's recent success

The government of Peru's announcement that poverty had fallen by 5.2 percentage points between 2006 and 2007 was greeted by a fair amount of skepticism on the part of the press and others within Peru. The doubts arose because Peru had not managed to achieve changes that large in the past, even though growth had been strong since 2003. Thus, the question posed in the introduction - was the reduction in poverty in Peru of 5.2 percentage points between 2006 and 2007 too good to be true - was a relevant question. Based on Table 7, one would conclude that the performance in poverty reduction was good, but not too good to be true. Regardless of whether one uses the change in poverty measured by the national poverty line or the change in poverty measured at \$ 3 a day PPP, -5.2 and -3.44¹¹, respectively, the performance can be seen to be extremely good, but not beyond the extreme points of the distribution of the empirical distribution for all countries or the distribution of predicted percentiles for Peru. As can be seen in Table 7, controlling for Peru's characteristics suggests that the outcome is not as extreme as would be predicted on the basis of the empirical distribution of the average annual changes of all countries.

Figure 4 illustrates the same point graphically.

Table 7: Relative Position of Peru on the Empirical and Conditional Distribution of a Poverty Reduction using a three dollars a day poverty line:

	Change	Empirical	Conditional ⁺	95% Confidence Interval*	
				Lower	Upper
Moderate poverty rate (national poverty line)	-5.20	95.0	88.0	83.0	92.0
Poverty rate at US\$ 3 PPP poverty line	-3.44	88.0	82.0	74.0	87.0

Source: Author's calculation; (*) Bootstrapped CI with 400 replications; (+) Conditional distribution constructed using the latest available data for Peru (2002-2005) and controls described in specification 3.

¹¹Difference between the 2006 and 2007 poverty level at 3 dollars per day (PPP), available at POVCALNET.

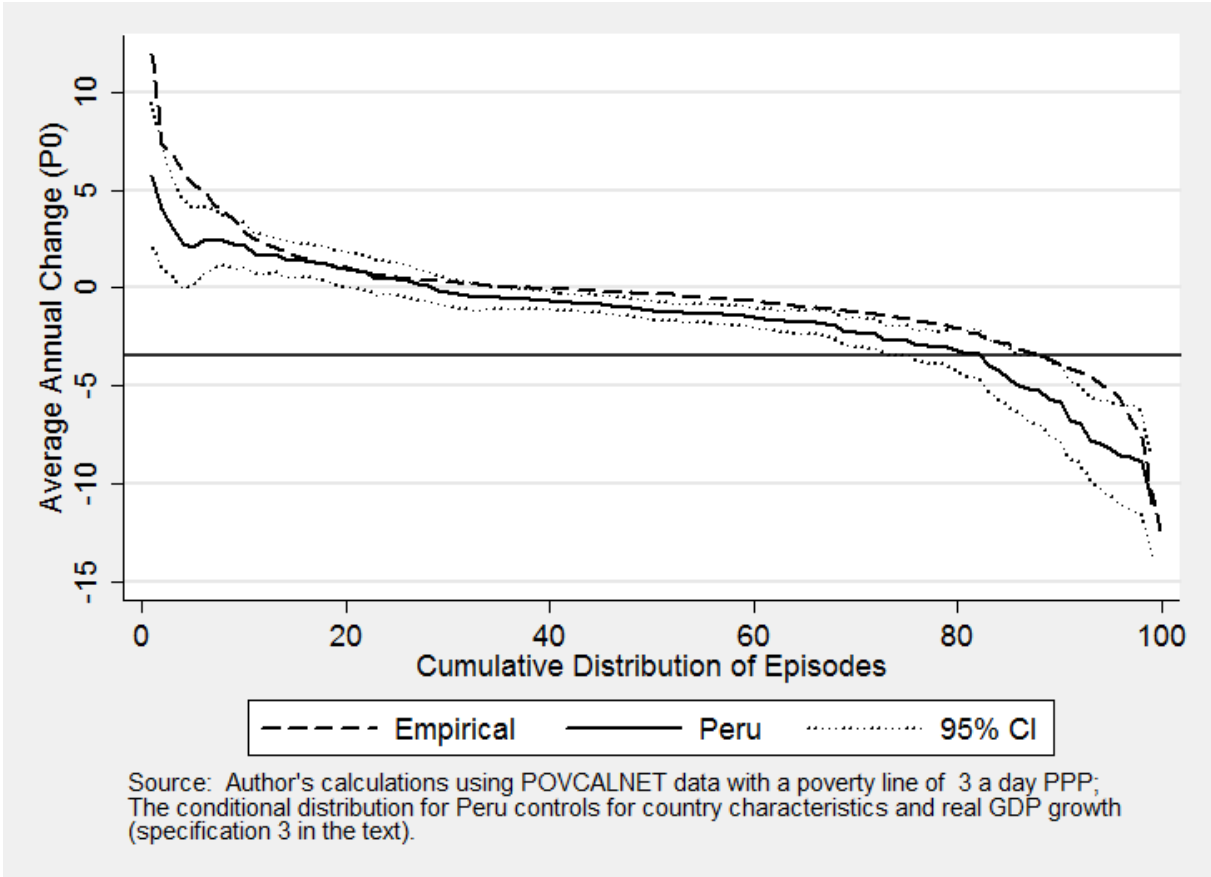


Figure 4: Empirical Distribution and Conditional Distribution of the Poverty Change for Peru using a 3 dollar a pay Poverty Line

5.3. Setting targets: The case of Dominican Republic

The introduction posed the question - how should the Dominican Republic decide what goal to set for poverty reduction? We suggest the following steps that would be appropriate for the Dominican Republic or for any other country interested in setting a goal:

1. Generate annualized variation of the poverty incidence per country¹² ;
2. Estimate 99 quantile regressions using as covariates at least the base line poverty level, additional covariates can be included if judged necessary¹³;
3. Generate predicted values for each quantile estimation and respective confidence interval by specifying the country-specific covariate values for the country of interest(the "Delta" method can be applied to estimate the confidence intervals);
4. Select the percentile that is considered appropriate for setting the goal;

In the last step, the country can exercise considerable discretion. It might set an aggressive goal by selecting the value that corresponds to the 80th percentile. A more modest stance would be to set the goal at a value that corresponds to the 70th percentile. The country may also want to set a goal relative to its more recent performance. If the country has been performing at a level corresponding to the 40th percentile, it might be too much of a stretch to set a goal that corresponds to the values of the 80th percentile. The country could choose to set a relative goal, rather than an absolute goal. For example, a country could set a goal that corresponds to the value that is 10 percentile points higher than what was achieved over the last 5 year period. Finally, the country could start with a particular numerical target and then ascertain to what percentile that value corresponds. There can often be some appeal to setting a particular value, as it may resonate with the general public. As long as it corresponds to a percentile that is a reasonable, but not excessive stretch target, this could be a good way of selecting a target.

Figure 5 presents the empirical and conditional distributions for poverty performance relative to the Dominican Republic. To determine the specific value for the change in poverty corresponding to different percentiles, one can simply go to the percentile on the x-axis, and read off the implied average annual change on the y-axis. These values are given in Table 8. Alternatively, the government could consider a specific quantitative target (fixing the value on the y-axis) and then read off the corresponding percentile on the x-axis to determine the implied performance that would be required to reach the target.

5.4. Performance improvements required to meet Poverty MDG

The introduction posed the question - Does achieving the Poverty MDG require more of a performance improvement for Africa than it does for Latin America?¹⁴ To answer this question, we first calculate the average annual change in poverty that would be required for each country in each region to reach the MDG target of halving their 1990 poverty rate. The results are presented by region in Table 9, where the aggregation is carried out by weighting the country's population in the region.¹⁵ This table also shows the initial weighted average of the level of poverty at \$1 a day for each region for the dates as close to 1990 as possible. Note that only for countries in Africa, Asia and Latin America and the Caribbean are the initial poverty figures at \$1 a day really significant. Because Africa is starting from a position of higher average poverty levels, the average annual change required to meet the MDG goals is higher. Based on the empirical distribution, the African countries would have to perform at the level of the 75th percentile to reach the target, while Latin American countries would only have to perform at the level of the 45th percentile to reach their targets.

¹²Comparable data on poverty can be obtained from POVCALNET.see (<http://iresearch.worldbank.org/PovcalNet/>)

¹³Quantile regressions are easily implemented in standard econometric and statistical packages such as Stata, SAS, R, and S-Plus. The data for many potential covariates can be obtained from the WB World Development Indicators see <http://publications.worldbank.org/WDI/>

¹⁴The article by Easterly (2007) raises concerns about all the MDGs, not just the one related to poverty. Leipziger (2008) presents an alternative view for all MDGs. In this paper, we only consider the MDG related to poverty.

¹⁵For a full list of countries on each region please see Table ?? in the appendix.

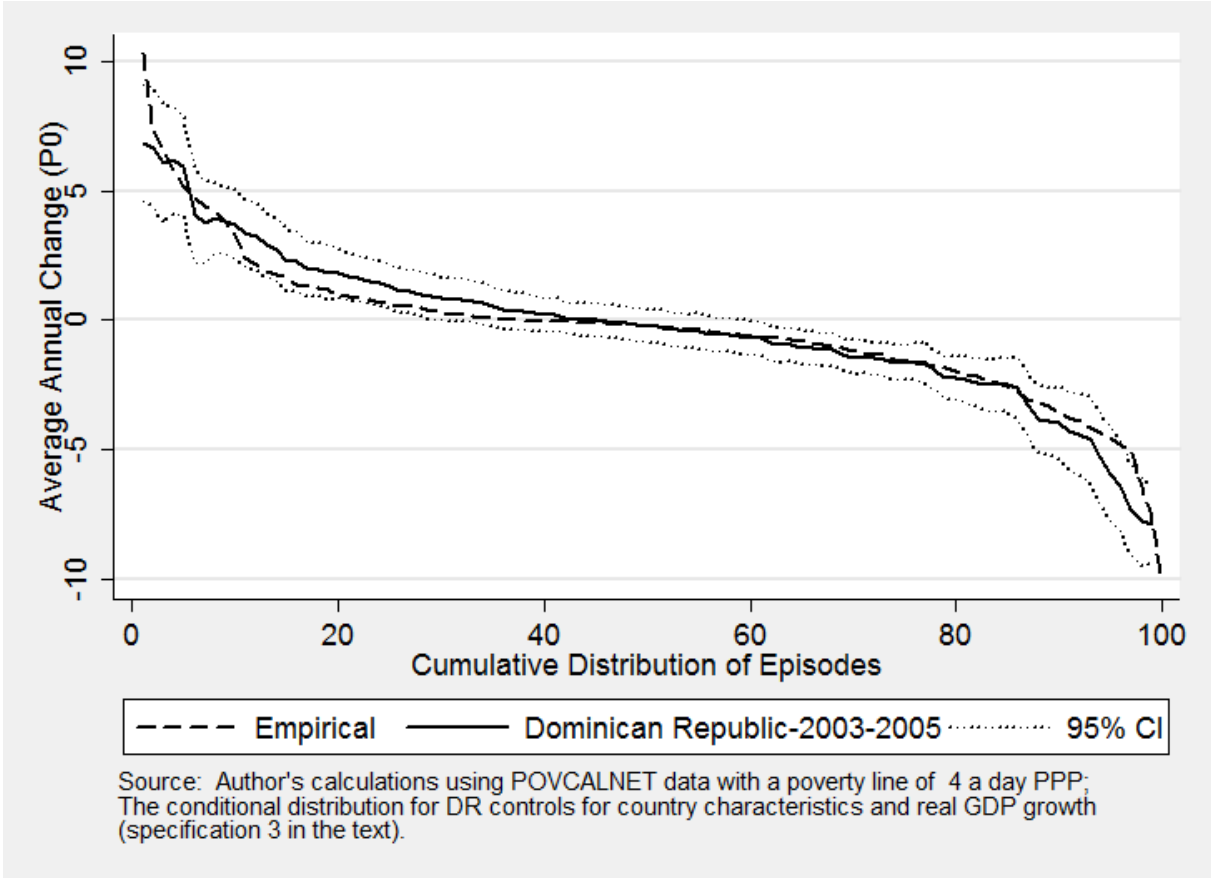


Figure 5: Conditional and Unconditional Distribution of the 4 dollars per day poverty variation for Dominican Republic (PPP)

Table 8: Target sensitiveness of Poverty Reduction for the Dominican Republic (4 USD PPP Poverty Line):

Percentile	Empirical	Conditional Distribution		
	Avg. Absolute Change	Avg. Absolute Change (1)	Lower Boundary (2)	Upper Boundary (3)
Specification 1 - Average Annual Poverty Change				
50th percentile	-0.186	-0.144	-0.300	0.013
60th percentile	-0.539	-0.398	-0.656	-0.139
70th percentile	-0.859	-0.822	-1.123	-0.520
80th percentile	-1.735	-1.808	-2.442	-1.173
90th percentile	-3.127	-3.588	-4.468	-2.708
Specification 3 - Average Annual Poverty Change				
50th percentile	-0.210	-0.142	-0.788	0.503
60th percentile	-0.546	-0.713	-1.366	-0.061
70th percentile	-0.875	-1.109	-1.693	-0.526
80th percentile	-1.783	-1.775	-2.635	-0.915
90th percentile	-3.239	-3.840	-5.379	-2.300

Source: Author's calculation; (*) Bootstrapped CI with 400 replications; (+) Conditional distribution constructed
 Universe: Full Sample.

Table 9: Required Poverty Reduction by Region to Reach Poverty MDG (Over Period 1990-2015)

Region	Poverty	Average annual change to Reach MDGs	Average Percentile		Number of Countries
	Level		Uncond	Cond	
AFR	55.3	-1.244	75.4	51.8	23
EAP	36.7	-0.964	68.3	65.9	11
ECA	3.7	-0.025	37.6	48.0	24
LCR	10.3	-0.225	44.7	53.1	20
MNA	4.2	-0.086	39.6	53.8	8
SAR	46.5	-1.123	75.4	52.6	5
Total	35.8	-0.888	66.3	58.4	91

Source: 1.25 USD PPP Poverty Line; PovCalNet (1985-2006).
 Universe: 91 Countries.

The assessment of regional differences in what is required to reach the MDGs changes, however, when one controls for the initial poverty level and poverty gap. This is revealed in the column labeled conditional in Table 9 that shows that there is virtually no difference in the required performance levels for different regions, once the initial conditions are taken into account. The distribution of predicted percentiles is obtained by combining the observed values of initial poverty and poverty gap in 1990 (or as close as possible), with estimated coefficients from quantile regressions of the change in poverty against the values of the initial poverty level and the initial poverty gap at the beginning of each episode¹⁶. It is somewhat surprising that across the different regions, meeting the MDGs requires performance close to the median in virtually all regions. The MDG goal of halving the poverty level in 25 years was not arrived at by determining what percentage reduction would result from setting a target of having each country perform at a level close to the median. Yet, that is what the implied performance target turned out to be.

¹⁶Easterly (2007) argues that it takes a higher level of per capita GDP growth to generate a given reduction in poverty when the initial poverty level is higher. Including initial poverty and the poverty gap should allow the specification to pick up this effect - acting through growth. In a separate estimation where we include both contemporaneous per capita GDP growth and an interaction term of contemporaneous GDP growth with the level of poverty at the beginning of the period, we find a generally negative but insignificant effect across the different quantiles (see Table ?? in the appendix for more details on the estimation).

Table 10: Actual Poverty Reduction by Region achieved to Date

Region	Average	Average Percentile		Number of Countries
	Change	Uncond	Cond	
AFR	-0.459	50.8	39.2	23
EAP	-2.161	85.7	84.6	11
ECA	0.157	34.5	48.8	24
LCR	-0.195	44.5	56.9	20
MNA	-0.028	38.8	55.4	8
SAR	-0.705	67.9	41.9	5
Total	-1.244	70.2	63.3	91

Source: 1.25 USD PPP Poverty Line; PovCalNet (1985-2006).
Universe: 91 Countries.

Table 11: Updated Required Poverty Reduction by Region to Reach Poverty MDG (From most recent observation to 2015)

Region	Average	Average Percentile		Number of Countries
	Change	Uncond	Cond	
AFR	-1.917	78.5	60.1	23
EAP	0.831	19.6	20.5	11
ECA	-0.259	41.0	51.2	24
LCR	-0.164	42.9	44.7	20
MNA	-0.144	39.5	43.4	8
SAR	-1.724	83.4	63.5	5
Total	-0.303	46.7	40.7	91

Source: 1.25 USD PPP Poverty Line; PovCalNet (1985-2006).
Universe: 91 Countries.

Table 10 presents information on the actual performance, from 1990¹⁷ to the most recent date for which data are available in POVCALNET. As in the previous table, the individual country data are weighted by the population size to arrive at the regional data. The table indicates that Asian countries have had the largest reduction in poverty, followed by African countries, with Latin American countries lagging behind. The picture changes somewhat when one compares the conditional distributions. While the relative position of the Asian countries doesn't change much, the performance of African countries is seen to be poorer, relative to its particular circumstances than is suggested by the empirical distribution. In contrast, the performance of Latin American countries is better, given its country characteristics, than is suggested by the empirical distribution.

Table 9 identifies the performance that is required to meet the MDGs in the different regions, going forward from the date of the most recently available data. In absolute terms, Africa must achieve much higher reductions in poverty than the other countries. They must also achieve higher rates of poverty reduction than was estimated to be required in 1990, reflecting the relatively poor performance between 1990 and the latest date for which data are available. In contrast, the required annual reductions for Asia are less than what was required at the outset, while the required change for Latin American countries is somewhat higher, but not as high as for Africa. Again, controlling for country characteristics changes things somewhat. The situation becomes more hopeful for Africa as the required performance judged by the conditional percentile is less and the difference between the conditional percentile of past performance and required future performance reflects the need for a smaller improvement than is suggested by looking at the differences in past and required future performance in the unconditional distribution.

Turning now to individual countries, we identify which individual countries have to raise significantly their performance if they are to meet the MDG for poverty. The challenge is greatest for those countries that have had poor performance in the past and would need to have good performance in the future to reach the poverty MDG. Table 12 identifies how the countries in our sample are distributed across the different performance

¹⁷or the nearest available observation within a 6 year window.

Table 12: Poverty Reduction Past and Future Performance (Unconditional and Conditional):

	Unconditional		Conditional	
	Rest of the World	LAC	Rest of the World	LAC
Good past performance				
Could reach MDG even with poor future performance	6	2	9	6
Could reach MDG with average future performance	8	1	9	2
Could reach MDG only with good future performance	14	0	0	0
Average past performance				
Could reach MDG even with poor future performance	5	5	1	0
Could reach MDG with average future performance	13	5	33	5
Could reach MDG only with good future performance	5	0	1	0
Poor past performance				
Could reach MDG even with poor future performance	0	0	0	0
Could reach MDG with average future performance	7	2	4	2
Could reach MDG only with good future performance	13	5	14	5
Total	71	20	71	20

Source: 1 USD PPP Poverty Line; PovCalNet (1985-2006).

Universe: 91 Countries.

categories. In this table, World includes LAC countries. Good performance is considered to be in the top third of the distribution, average in the middle third and poor in the bottom third. In the columns labeled unconditional, the relevant distribution is the empirical distribution - making no adjustments for country characteristics. In the columns labeled conditional, the relevant distribution is of predicted percentiles, based on a specification that controls for the initial poverty level and the initial poverty gap.

The majority of the countries can reach the MDGs with only poor to average performance in the future. Based on the conditional distribution, there are no countries that had good performance in the past and require good performance in the future to achieve the goals. Thus, there were no excessively ambitious targets set. There are quite a few countries that will only be able to achieve the MDGs with good performance in the future. Some had regular performance in the past and some had poor performance.

Figure 6 through 7 identify how past performance and required future performance to reach the poverty MDG are related for specific countries. The figures are reported separately for the world (which includes LAC) and for LAC countries. The percentiles in these two figures refer to the percentiles in the empirical distribution. Figure 8 and Figure 9 present the same relationship, but for percentiles of the conditional distributions of past and required future performance to reach the poverty MDG. Based on the analysis of the conditional distributions, the countries in LAC that would have to raise their performance from poor to good in order to reach the MDGs are Argentina (urban), Bolivia, Colombia, Paraguay, Peru, and Venezuela. The countries in the rest of the world that would have to realize similar performance gains to reach the poverty MDG are: Georgia, Madagascar, Mali, Nigeria, Uganda, Yemen, and Zambia.

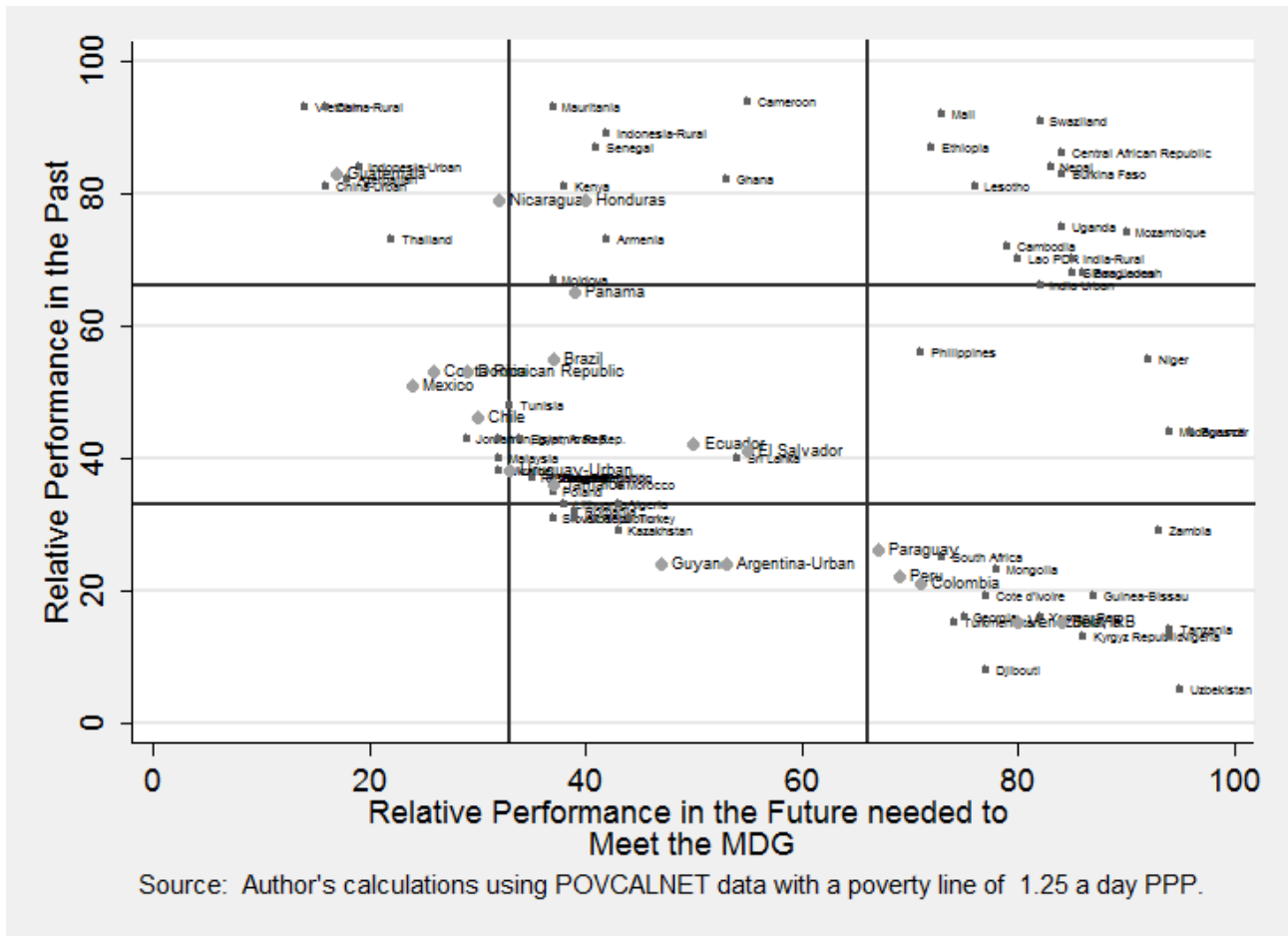


Figure 6: Distribution of Countries According to their Past and Future Relative Performance



Source: Author's calculations using POVCALNET data with a poverty line of 1.25 a day PPP (only LAC countries).

Figure 7: Distribution of LAC Countries According to their Past and Future Relative Performance

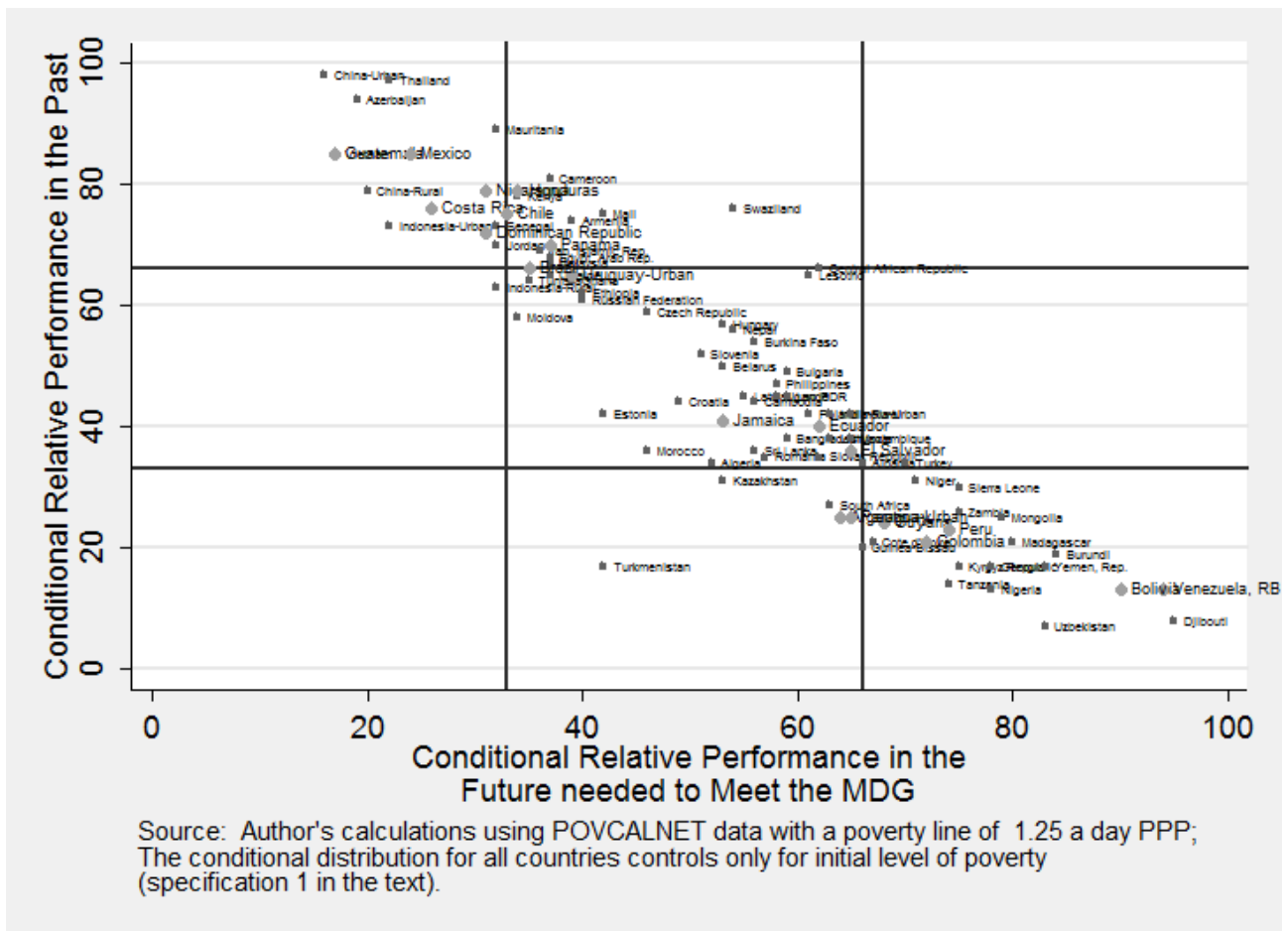


Figure 8: Distribution of Countries According to their Conditional Past and Future Relative Performance.

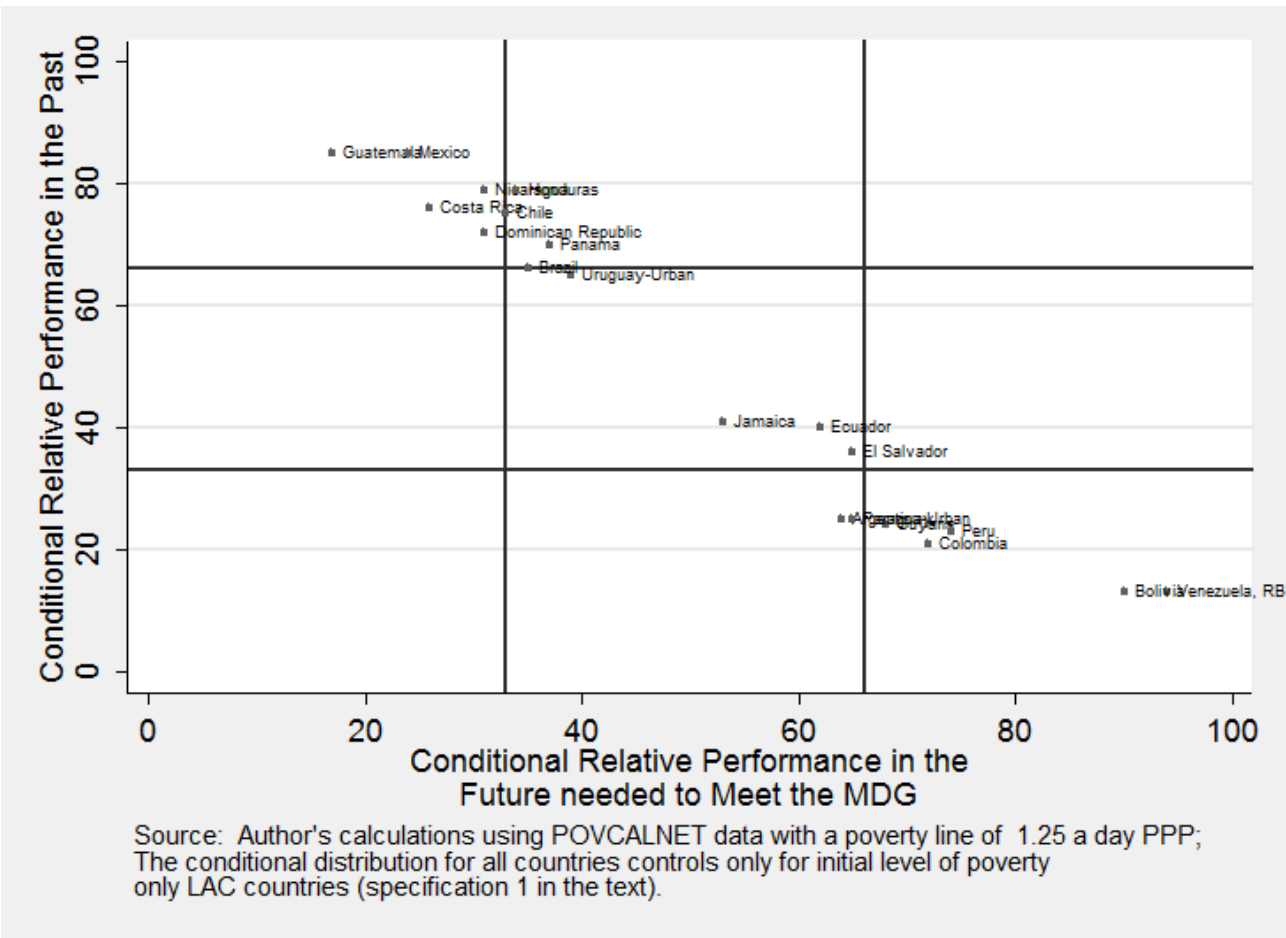


Figure 9: Distribution of LAC Countries According to their Conditional Past and Future Relative Performance.

6. Final Remarks

This paper set out to provide some context for assessing changes in poverty that countries have achieved and for guiding goals that might be set for poverty reduction. It has carried out an extensive analysis of the international data on poverty to try to establish what constitutes good and poor performance. There are two main contributions. First, the paper has documented the empirical distribution of poverty changes. This documentation allows one to provide a plausible answer to a very basic question - what constitutes good performance in poverty reduction. If pressed for a single number for performance worldwide, a plausible response is a decrease of 2 points per year. If pressed for a number as to what would correspond to good performance among LAC countries, that number would rise to 2.5 percent. Over the period from 1985 to 2004, this corresponds to a performance that is better than 80 percent of the recorded changes.

The second main contribution is the development of an approach that allows one to characterize what constitutes good and poor performance for specific countries or regions. Using quantile regressions provides a means of generating predicted percentiles that take into account the particular characteristics of the countries. Benchmarking exercises are useful for assessing the degree of success - or failure - implicit in observed performance as well as for setting targets. For example, in the case of Peru, a considerable amount of skepticism arose around a reported estimate of poverty that indicated a considerable decline in poverty during a period of sustained growth. Benchmarking that performance showed that, given past performance and the prevalent conditions in Peru, the performance was very good, but not infeasible. In the case of the Dominican Republic, carrying out benchmarking exercises allows the government to set a target knowing how ambitious the goals are. For example, setting a target of reducing poverty by 1.7 points per year would require a level of performance better than 80 percent of the observed episodes of countries with characteristics similar to those of the Dominican Republic.

This work would not have been possible without the efforts of many people to generate and maintain international comparative data. As this type of data become increasingly available and increasingly easy to access and to use, the type of approaches set out in this paper will become more useful. It is possible to use the approach to also analyze performance in other dimensions of poverty, such as the poverty gap, or, more generally, for social indicators.

References

- Ackland, R., Dowrick, S., Freyens, B., 2007. Measuring Global Poverty: Why PPP Methods Matter.
- Adams, R. H., 2004. Economic growth, inequality and poverty: Estimating the growth elasticity of poverty. *World Development* 32 (12), 1989–2014.
- Chen, S., Ravallion, M., 2008. China is poorer than we thought, but no less successful in the fight against poverty. Policy Research working paper ; no. WPS 4621.
- Easterly, W., 2007. How the Millennium Development Goals are Unfair to Africa. *Brookings Global Economy and Development Working Paper No. 14*.
- Koenker, R., 2005. *Quantile Regression*. Cambridge University Press.
- Koenker, R., Bassett, G., 1978. Regression quantiles. *Econometrica* 46 (1), 33–50.
- Leipziger, D. M., February 2008. Millennium development goals and africa: An alternative view. *PREM Notes* 116, 6.
- Oehlert, G. W., 1992. A note on the delta method. *American Statistician* 46, 27–29.
- Ravallion, M., 1995. Growth and poverty: Evidence for developing countries in the 1980s. *Economics Letters* 48 (3-4), 411–17.
- Ravallion, M., 2002. How Not to Count the Poor: A Reply to Reddy and Pogge. World Bank. www.worldbank.org/research/workpapers.
- Ravallion, M., Chen, S., Sangraula, P., 2008. Dollar a day revisited. Policy Research working paper ; no. WPS 4620.
- Reddy, S., Pogge, T., 2002. How not to count the poor. *unpublished manuscript*, Columbia University.
- Reddy, S., Pogge, T., 2003. How Not to Count the Poor!—A Reply to Ravallion.