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CHANGES IN INEQUALITY AND POVERTY IN LATIN AMERICA: LOOKING BEYOND INCOME TO HEALTH AND EDUCATION

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This paper uses Demographic and Health Survey data from six Latin American countries to analyze levels and trends of inequality for two important non-income measures of well-being, children's stature and adult women's educational attainment. Our purpose is to determine whether the worrying trend of increasing income inequality in Latin America is also found in non-income dimensions of well-being. We find that it is not. Almost across the board, health inequality, measured by children's stature, and education inequality, measured by young women's years of schooling, have fallen in these countries in the late 1980s and 1990s, often dramatically. Further, by decomposing changes in non-income dimensions of *poverty* into shifts in the mean and changes in the distribution of health and education, we show that reduced inequality has contributed to significant reductions in education poverty, and to a lesser extent, health poverty. This, too, is a very different result from the income inequality literature.

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I. Introduction

The discussion of inequality stirs greater passion in Latin America than anywhere else in the world. This is understandable given the evidence that inequality in Latin America is higher than elsewhere (Inter-American Development Bank 1998). Reinforcing this concern is the perception that poverty has remained an intractable problem owing largely to the persistence and worsening of inequality.

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More specifically, there is a widespread notion that even in periods of relatively good economic performance, the poor are being left behind due to the high level of income inequality (de Janvry and Sadoulet 2000), and conversely, that economic stagnation is particularly harsh for the poor because of the prevailing inequality in the region (Kanbur and Lustig 2000).

Much of the evidence for the worsening of inequality and its consequences for poverty in Latin America comes from the 1980s, the so-called "lost decade". The stagnation that followed the first debt crisis in the 1980s improved only modestly in the 1990s, despite major economic reforms in many countries in the region. While the verdict is still out on the impact of reforms in terms of restoring economic stability and promoting economic recovery, the preponderance of the evidence suggests that poverty did not improve much in the late 1980s and 1990s (Londoño and Székely 1997; Wodon 2000; Székely et al. 2000; World Bank 2001), and that efforts at poverty alleviation are being hampered by the underlying inequality of incomes (Székely 2003; Wodon 2000; Psacharopoulos et al. 1995). There is also evidence that inequality itself is an impediment to economic growth and prosperity (Stiglitz 1996; Barro 2000; Banerjee and Duflo 2003), though this is controversial (Forbes 2000). Likewise, fundamental concerns over social justice and how they relate to income inequality remain an important issue in Latin America.

The debate in Latin America over the level and changes in inequality, as well as its contribution to changes in poverty, has focused on a single dimension of well-being—incomes. While we do not deny that income is an important measure of well-being, we do not believe that it captures all aspects of well-being. Led by Amartya Sen, theorists have argued convincingly that well-being is multidimensional, comprising characteristics such as good health, adequate nutrition, literacy, and freedom of association. Income and expenditure are *instrumentally* important as means to achieving these ends, but it is the ends that are *intrinsically* important, and merit recognition and measurement in their own right (Sen 1985, 1987). These ideas are now widely accepted in theory, yet they are almost universally ignored in practice; empirical studies of inequality study income or expenditure alone. Our purpose in this paper is to begin to rectify the detachment of theory and practice in this field.

Defining poverty and inequality in terms of non-income dimensions of well-being has the further advantage that we measure outcomes such as nutrition, health, and education at the individual rather than household level. When properly calculated, income inequality measures are based on individuals, not households,

but it is necessary to make an arbitrary assumption about how household incomes are shared among household members, which is almost always an equal sharing rule. This assumption is potentially misleading in ways that the study of intra-household allocation is only beginning to understand. Another reason we believe that inequalities in dimensions of well-being such as health and education are particularly important is that public policy has a relatively clear place in addressing them, more so than in the case of reducing income inequality. It has long been accepted that a primary goal of government expenditure is to provide for the basic needs of the population, such as health and education.

With this background in mind, this paper analyzes evidence on levels and trends of non-income inequality, particularly for health and education, and compares that evidence to the existing evidence on income inequality in the region during the late 1980s and 1990s. We focus on health and education because they are two fundamental measures of well-being whose importance almost everyone can agree upon. The Human Development Index, for example, includes an income indicator (GDP per capita), a health indicator (life expectancy at birth), and an education indicator (adult literacy). Our purpose is to determine whether the worrying trend of increasing inequality in Latin America is found in non-income dimensions as well.

Section II presents the details of the Demographic and Health Survey (DHS) data that we use in our analysis. This is followed in Section III with a discussion of methods employed to measure health and educational outcomes. For education, we use the years of education completed among a representative sample of women aged 22 to 30 as our measure of well-being. For health, we use the heights of children aged 0 to 36 months. Section III discusses the merits of these variables and, more importantly, the approach that we take to derive inequality measures for them. Our results, found in Section IV, paint a picture of significant declines in education and health inequality. The concern that is often raised in terms of the high degree of income inequality contributing to the perpetuation of persistent poverty is shown not to apply to well-being in the dimensions of health and education that we measure. Further, both declines in inequality and increases in mean levels of education and health have contributed to substantial declines in health and education poverty in Latin America, even as income poverty has remained stagnant or declined only modestly. We discuss possible reasons behind, and implications of, the contrasting findings between our results on education and health and existing results for incomes in the final section of the paper.

II. Data

We use all the Demographic and Health Surveys (DHS) from Latin American countries for which more than one survey exists. These comprise 22 surveys from seven Latin American countries – Bolivia, Brazil, Colombia, Dominican Republic, Guatemala, Nicaragua, and Peru. The DHS surveys are conducted in single rounds with two main survey instruments: a household schedule and an individual questionnaire for women of reproductive age (15-49).[1] The former consists of a listing of all household members and further collects information on the demographic composition of the households. Information on educational attainment of all household members is included. The individual survey includes information on the health, fertility history, birth control, and nutritional status of women and their young children. The DHS program is designed for typical self-weighted national samples of 5,000 to 6,000 women between the ages of 15 and 49. A distinct advantage of employing the DHS surveys is that the designs of the surveys are nearly uniform over time and across countries.

We focus on two alternative measures of well-being: health and education. There are many potential health variables that one might use as measures of well-being. Because we want to consider distributions of well-being, we must use continuous variables, which rules out mortality (the health variable in the Human Development Index), and also predicted variables, because the prediction equation will compress the distribution. Potential variables include life expectancy, morbidity, disability adjusted life years (DALYs), and activities of daily living (ADLs). Life expectancy is based on life tables collected at a given point in time, but that time corresponds to the past, not to the future experiences of those presently alive (Deaton 1999). A further problem with this approach is that it does not indicate anything about the "healthiness" of the life spans observed. Unfortunately, the DHS do not include the information necessary to calculate adjustments to life expectancy such as DALYs, or data on activities necessary to calculate ADLs. And finally, some indicators, particularly self-reported illness, are too prone to reporting biases. Instead, we employ an age- and gender-standardized height for children ages 0 to 36 months to measure health poverty and inequality.[2]

The growth of young children has several desirable properties and

[1] For more details on the DHS, see http://www.measuredhs.com/. Macro International, Inc. implements the DHS program with funding from USAID.

[2] We use this age range because some DHS surveys collect anthropometric data only for children up to 36 months.

characteristics for the purposes of this paper, although, we want to emphasize that it by no means captures all aspects of health, any more than other indicators would. First, there is an abundance of good quality and comparable anthropometric data on growth of pre-school age children. Second, growth of children is widely acknowledged as an excellent and objective indicator of children's general health status (Cole and Parkin 1977; Mata 1978; Tanner 1981; Mosley and Chen 1984; WHO 1995; Martorell et al. 1975; Beaton et. al 1990; Strauss and Thomas 1995; Behrman and Deololikar 1988), capturing various dimensions of the health of the individual and the developmental and socio-economic environment in which they grow. Third, measuring growth of children is not susceptible to self-reporting bias, and the errors in measurement are unlikely to be correlated with socioeconomic characteristics. Fourth, unlike data on adult anthropometrics, we need not worry about the genetic (racial or ethnic) makeup of the population influencing our comparisons, since it is now well established that the distributions of heights of healthy children among populations are comparable around the world (Habicht et al. 1974; Bustos et al. 2001). Healthy children's heights obviously vary with age, and also by gender, so it is important to standardize heights by age and gender. This is usually done by reporting z-scores, i.e., the number of standard deviations above or below the median of a distribution of healthy children of the same age and gender.[3] But since z-scores can be negative, and typically are for most poor children, we cannot calculate most traditional distribution statistics, such as the Gini, with them. Thus, rather than use z-scores, we use "standardized heights". We first find each child's percentile in the reference population distribution for his/her age and gender. We then convert that percentile to the height associated with that percentile for an arbitrarily chosen age and gender: 24-month-old girls for this paper.[4] Thus, the standardized height measure is constructed such that a child's position in the distribution, in terms of the WHO reference population percentiles, is the same for his/her actual height and standardized height. More specifically,

$$H = F_{\bar{a},\bar{g}}^{-1}(F_{a,g}(h)) \tag{1}$$

where F is the distribution function of heights in the WHO population for age/sex

[3] The standard deviation as well as the median are calculated from the reference population, which as recommended by the WHO, is the sample of healthy children in the NHANES-III data from the United States (WHO 1983, 1995).

[4] None of the results in the paper are sensitive to the choice of age/gender for standardization.

group defined by a (age) and g (gender); h is the actual height, $\bar{a}$ = 24 months, $\bar{g}$ = female, and H is standardized height. Because this transformation is monotonic, it preserves the rank order of the children of a given age and gender. More importantly for our purposes, it preserves the relative variation between two samples of children of the same age and gender. That is, if the actual heights of four-year-old boys are more concentrated in 1995 than 2000 in a given country, then the same will be true of the distributions of their standardized heights.

The measure of education used in this paper is the number of years of schooling for women aged 22-30. We choose not to use the entire sample of women aged 15-49 because, at the younger end, we want to avoid censoring for women who have not yet reached the age at which they should have completed post-secondary school and, at the older end, we want to limit our attention to those who have finished their schooling in the not-too-distant past.[5] To be consistent with the 22-year-old age limit, we truncate years of schooling at 16. This never affects more than a few women in each sample. Using simple years of schooling has many disadvantages, including differences in school quality and cognitive outcomes for comparable numbers of years enrolled. While such drawbacks make between country comparisons suspect, the inter-temporal comparisons that we make are probably less biased by the fact that we do not take quality of schooling into account. Nevertheless, to the extent that variation in quality does change over time, our estimates will misrepresent the change in education inequality. Finally, note that children's enrolment is not useful for inequality comparisons because it is a discrete variable.

III. Methods

A. Measuring inequality

There are two major strains in the literature on measuring inequality in non-income dimensions. The first and most common examines differences in health (or other social indicators) across a variety of social and economic strata such as race, ethnicity, location, gender, and, most commonly, income. Making comparisons of health across populations with different social and economic characteristics is

[5] Note that very few women actually attend post-secondary school in these samples, so we could use a younger sample of even more-recent graduates using 18 rather than 22 as our lower age limit. The results that we report later for education are almost identical if we do this.

often referred to in the literature as the "gradient" or "socioeconomic" approach to health inequality (van Doorslaer et al. 1997; Wagstaff, Paci, and van Doorslaer 1991; Wagstaff and van Doorslaer 2002). An analogous literature examines socioeconomic inequalities in educational outcomes (Filmer and Pritchett 2001). The gradient approach is useful for examining the correlation of a health or educational outcome with a given characteristic. Interest in this correlation arises from various types of discrimination, prejudice, and other legal, social, and economic norms that may contribute to stratification and fragmentation, and subsequent inequality in access to material resources and various correlated welfare outcomes.

A second, univariate, approach to measuring health or education inequality considers the variation or dispersion of a health or educational outcome *per se*, without regard to its correlation with other variables. This is analogous to the standard approach used for measuring income inequality. Thus, to examine inequality of educational attainment, one might construct a Lorenz curve by ordering individuals along the x-axis by years of schooling completed and plotting the cumulative share of the sample with a given number of years completed on the y-axis, exactly as one does for income. Previous work using this approach includes Thomas, Wang, and Fan (2000) and Lopez, Thomas, and Wang (1998) who develop the concept of an education Gini index based on school attainment data for working-age adults. Studies that use an analogous approach for health inequality include Pradhan, Sahn, and Younger (2002), LeGrand (1987), and Murray, Gakidou and Frenk (1999).

For those who wish to take seriously the notion that well-being should be measured in multiple dimensions, the univariate approach is preferable. By ordering the sample from poorest to richest in the dimension of the conditioning variable (usually income), the gradient method implicitly gives primacy to inequality in that dimension. Inequality in the dimension of health or education is only relevant insofar as it is correlated with income inequality. Intuitively, it does not make sense to view a given distribution of health outcomes as undesirable if it is correlated with the income distribution, but acceptable if it is not. Yet that, too, is an implication of the gradient approach. For that reason, we employ univariate methods in this paper.

For easy comparison to published work on income distributions in Latin America, we focus on the Gini coefficient, which is twice the area between the 45-degree line and the Lorenz curve:

$$\text{Gini} = 2\left(\frac{1}{2} - \int_0^1 L(p)dt\right) = \left(\frac{2}{\mu}\right)\text{cov}\big(y, F(y)\big) \tag{2}$$

In the case of our health and education variables, y measures individuals'

health (standardized height of children) and education (years of school completed); $F(y)$ is the cumulative density function of the welfare ordering; and μ is mean of the welfare variable.

B. Poverty lines

As mentioned in the introduction, an important aspect of our concern about health and education inequality in Latin America is to determine the extent to which inequality contributes directly to the lack of progress in poverty alleviation. We examine this question by first looking at poverty changes in the dimension of health and education, and then decomposing those changes into the changes in the mean and the changes in the shape or dispersion of the distribution. Consequently, we first define a poverty line for each of these non-income measures.

In the case of our health indicator, a child is typically said to be in poor health – or put alternatively, suffering from health poverty – if his or her z-score is two standard deviations below the median of the reference population (World Health Organization 1983). We use this cut-off, transformed to standardized heights, as our health poverty line. In the case of education, we define education poverty as not completing six years of primary schooling, although, we test the sensitivity of our results to this assumption by varying the poverty line.

C. Decomposition of changes

Following the methods proposed by Datt and Ravallion (1992), Kakwani and Subbararo (1990), Kakwani (1997); and Jian and Tendulkar (1990), the components of the total change in poverty can be captured using a class of measures that are fully characterized by the poverty line (z), the mean of the distribution (μ), and the Lorenz curve (L). For date t the poverty measure can be written as

$$P_t = P(z, \mu_t, L_t). \tag{3}$$

A change in poverty between period t and $t+n$ can then be decomposed into a growth component, defined as the change in poverty due to a change in the mean of the distribution while holding the Lorenz curve constant at that of the reference year, and the redistribution component, defined as the change in the Lorenz curve while keeping the mean of the distribution constant at that of the reference year (Datt and Ravallion 1992).

Table 1. Health and education inequality and poverty headcount indexes

Country	Health				Education			
/Year	Gini	SE	Poverty	SE	Gini	SE	Poverty	SE
Bolivia								
1989	0.0357	0.0006	0.3791	0.0095	0.4550	0.0035	0.5563	0.0107
1994	0.0349	0.0005	0.2678 *	0.0082	0.4100 *	0.0031	0.4910 *	0.0105
1997	0.0344 *	0.0003	0.2435 *	0.0070	0.3516 *	0.0026	0.4084 *	0.0093
Brazil								
1986	0.0324	0.0007	0.2776	0.0169	0.3966	0.0049	0.5528	0.0122
1996	0.0307 *	0.0004	0.1028 *	0.0061	0.3370 *	0.0021	0.4829 *	0.0090
Colombia								
1986	0.0311	0.0007	0.2543	0.0120	0.3612	0.0042	0.5407	0.0128
1990					0.3297	0.0025	0.4433 *	0.0097
1995	0.0270 *	0.0003	0.1264 *	0.0062	0.3110 *	0.0022	0.3962 *	0.0089
2000	0.0260 *	0.0003	0.1313 *	0.0066	0.2953 *	0.0021	0.3757 *	0.0091
Dom. Rep.								
1986	0.0357	0.0007	0.2069	0.0092	0.3440	0.0031	0.4356	0.0109
1991	0.0307 *	0.0004	0.1662 *	0.0082	0.3546	0.0056	0.3353	0.0105
1996	0.0288 *	0.0004	0.1103 *	0.0065	0.3290 *	0.0029	0.3145 *	0.0098
2002	0.0298 *	0.0003	0.0894 *	0.0037	0.2926 *	0.0016	0.2630 *	0.0058
Guatemala								
1987	0.0363	0.0005	0.5778	0.0105	0.6296	0.0049	0.8564	0.0089
1997	0.0362	0.0003	0.4576 *	0.0067	0.5584 *	0.0031	0.7581	0.0077
1999	0.0361	0.0004	0.4163 *	0.0101	0.5259 *	0.0044	0.7485	0.0111
Nicaragua								
1997	0.0336	0.0003	0.2184	0.0065	0.3923	0.0027	0.4994	0.0085
2001	0.0317 *	0.0003	0.1615 *	0.0061	0.3887	0.0027	0.5210	0.0088
Peru								
1986					0.3875	0.0045	0.4267	0.0138
1992	0.0335	0.0003	0.2675	0.0065	0.2994 *	0.0021	0.3406 *	0.0073
1996	0.0326 *	0.0002	0.2290 *	0.0044	0.3118 *	0.0016	0.3424 *	0.0054
2000	0.0317 *	0.0002	0.2188 *	0.0050	0.2701 *	0.0014	0.2884 *	0.0054

Notes: * indicates that the difference in pairwise comparison with base year is statistically significant. Furthermore, the differences in the following pairwise comparisons are statistically significant: (i) Health Gini: Colombia 1995/2000, Dominican Republic 1991/1996 and 1996/2002, Peru 1996/2000; (ii) Health poverty: Bolivia 1994/1997, Dominican Republic 1991/1996, 1991/2002 and 1996/2002, Guatemala 1997/1999; (iii) Education Gini: Bolivia 1994/1997, Colombia 1990/1995, 1990/2000 and 1995/2000; Dominican Republic 1991/1996, 1991/2002 and 1996/2002, Guatemala 1997/1999, Peru 1992/1996, 1992/2000 and 1996/2000; (iv) Education poverty: Bolivia 1994/1997, Colombia 1990/1995 and 1990/2000; Dominican Republic 1991/1996, 1991/2002 and 1996/2002, Peru 1992/2000 and 1996/2000.

The Datt and Ravallion decomposition is not symmetric, i.e., it will differ depending on which year is taken as the reference point. Kakwani's (1997) axiomatic approach to the decomposition problem avoids this problem by averaging the Datt and Ravallion decompositions calculated with each year as the reference. This practice has been adopted widely (McCulloch, Cherel-Robson, and Baluch 2000; Dhongde 2002; Shorrocks and Kolenikov 2001; Christiaensen, Demery, and Paternostro 2002), not only because it is consistent with the axiomatic properties proposed by Kakwani, but also because it eliminates the Datt and Ravallion residual, which is difficult to interpret. We then apply this technique to our continuous health and education measures of poverty.

IV. Results

We begin by presenting our results on health and education inequality. The first two data columns in Table 1 present the Gini coefficients for health inequality and their standard errors for the seven countries for which we have data. In all cases, inequality is falling from one survey period to the next. In some cases, the Ginis fall quite dramatically. For example, in Colombia, the Gini falls from 0.0311 to 0.026 between 1986 and 2000. Most of this statistically significant decline appears to have taken place in the late 1980s and first half of the 1990s as opposed to later in the 1990s. The decline in health inequality in the Dominican Republic is also large, falling from 0.036 to 0.030, although, there was little change between the last two periods of 1996 to 2002.

A look at the education inequality numbers and their standard errors in Table 1 paints an even more dramatic picture of improving equality. In every country, inequality of education outcomes has fallen substantially. For example, in Peru, the education Gini has fallen from 0.388 to 0.270 between 1986 and 2000. In Guatemala, the decline was from 0.630 to 0.526 between 1987 and 1999, while in Brazil it was from 0.397 to 0.337 over a ten-year period. All these changes are statistically significant. Nicaragua is the only country not showing a decline in education inequality, but note, it is also the country where the interval between surveys is shortest – only 4 years – and that this interval is in the relatively late period of 1997 to 2001.[6]

[6] A referee has pointed out that the Gini measures *relative* inequality because it is scale invariant. In the referee's words, " … [if] years of education increase from 1 to 2 for [a] poor [person], and from 10 to 19 for [a] rich one, [the Gini] goes down, even though the poor person only increased his education by 1 year and the rich one by 9." This is because the poor person's education increased by 100 percent while the rich person's increased by 90 percent. To gauge the robustness of our results, we also calculated the interquartile range, a measure of absolute

Table 2 compares the trend lines that Székely (2003) estimated for income inequality with the changes recorded for health and education inequality in Table 1. While Székely does not present test statistics on his trend coefficients,

Table 2. Trends and changes in Gini coefficient and poverty headcount for income, health and education (coefficients)

	Gini Trend[a]	Changes in Ginis[b]		Headcount Trend[a]	Changes in Headcount[b]	
Country	Income	Health	Education	Income	Health	Education
Bolivia	0.0076	-0.0013 *	-0.1034 *	-0.0045	-0.1356 *	-0.1479 *
Brazil	0.0009	-0.0017 *	-0.0596 *	-0.0126	-0.1748 *	-0.0699 *
Colombia	-0.0003	0.0260 *	-0.0659 *	-0.0067	0.1313 *	-0.1650 *
D.R.	-0.0004	-0.0059 *	-0.0514 *	-0.0178	-0.1175 *	-0.1726 *
Guatemala		-0.0002	-0.1037 *		-0.1615 *	-0.1079 *
Nicaragua	0.0071	-0.0019 *	-0.0036	0.0040	-0.0569 *	0.0217
Peru	0.0036	-0.0018 *	-0.1174 *	0.0003	-0.0487 *	-0.1383 *

Notes: a - These are time trend coefficients estimated by Székely (2003); b - These differences are derived by subtracting the Gini for the last year from the Gini for the first year for which we have data; * indicates statistically significant change in Ginis and headcounts. See Table 1 for actual Ginis and headcount indexes.

we compare his trend numbers with the statistical analysis of whether there is a significant change in the Ginis between the first and last survey years for which we have data.[7] The table shows the contrast between the income inequality trends, which are mostly positive, but small, and the statistically significant changes in the health and education Ginis. The changes in the health and education Ginis are negative in all cases, implying less inequality over time, and with the exception of health in Guatemala and education in Nicaragua, these changes are statistically significant. One of the reasons that inequality concerns Latin American policy analysts is that worsening inequality has impeded the region's efforts to reduce poverty. To examine this issue for health and education poverty, we next report on

inequality, for each distribution. For years of education, these are roughly constant across time in most countries, at six or seven years of schooling, though Bolivia is an exception with a decline from nine to six years. For children's standardized heights, the interquartile ranges actually decline in every country except Bolivia. This is remarkable, since interquartile ranges for incomes rarely decline in growing economies, even when the Gini falls.

[7] We also estimated trends, which gives similar results, but that does not make much sense. With only two to four observations per country, it is easy enough to see the trend in Table 1.

the results of our Datt and Ravallion decompositions. As discussed earlier, we define a health poverty line at two standard deviations below the median of the standardized height of the reference population, and an education poverty line at six years of schooling.

First, however, we consider changes in health and education poverty *per se*. Table 1 reports the changes in levels of poverty based on these three indicators. In most countries, child health poverty has declined markedly. For example, stunting in Colombia falls from 0.25 to 0.13 between 1986 and 2000; in the Dominican Republic the decline is from 0.21 in 1986 to 0.09 in 2002; while in Brazil, the health-poverty index drops from 0.28 in 1986 to 0.10 in 1996. Education poverty also shows an almost across the board decline. For example, in Peru, there is a marked decline in the education headcount numbers between 1986 and 1992, and again between 1996 and 2000. The Dominican Republic likewise witnessed a monotonic decline in education poverty across the four surveys that span 1986 to 2002. We do note, however, that the rate of improvement appears to be slowing somewhat in many of the countries for which we have data, a finding that is consistent with the expectation that this would occur as poverty levels approach an asymptote. Nevertheless, health and education levels in our sample countries are still well below those found in the wealthier countries to the north, so the reduced rate of improvement is of some concern.

We also make comparisons between the income poverty trends reported by Székely (2003) and the statistical comparison of changes in health and education poverty between the first and last year for which we have data (Table 2). The income-based headcount ratios show a declining poverty trend in four of six countries, similar to our inter-temporal comparisons where we observe that with the exception of education in Nicaragua, where the difference between the two periods is not significant, child health and education outcomes improve across the board, and all of these differences are statistically significant.

When we decompose these changes into the effect of shifts in the mean versus changes in the distribution, we find that it is a shift in the mean values that drives the result when there is a rapidly declining rate of stunting (Table 3).

For example, in Brazil, the drop in the nutrition headcount poverty rate from 27.8 percent in 1986 to 10.3 percent, was 90 percent attributable to the growth component of the decomposition – that is, holding the mean constant, the malnutrition headcount would have fallen from 27.8 to 26.2 percent, while holding the distribution of health constant, the shift in the mean would have led to a decline from 27.8 to 11.81 percent. There were, however, a number of cases where

Table 3. Decomposition of health and education poverty index into changes in mean and changes in distribution

	Health poverty index			Education poverty index		
	Change	Decomposition		Change	Decomposition	
Country/years		Mean	Distribution		Mean	Distribution
Bolivia						
1989, 1997	-13.56	-13.90	0.34	-14.79	-8.70	-6.09
1989, 1994	-11.13	-10.70	-0.43	-6.53	-1.91	-4.62
1994, 1997	-2.43	-2.47	0.04	-8.26	-3.37	-4.89
Brazil						
1986, 1996	-17.48	-15.96	-1.53	-6.99	-1.92	-5.07
Colombia						
1986, 2000	-12.30	-8.98	-3.32	16.50	-13.95	-2.56
1986, 1995	-12.78	-9.76	-3.03	-14.45	-14.67	0.22
1986, 1990				-9.74	-3.14	-6.60
1995, 2000				-6.76	-2.87	-3.89
1990, 1995				-4.71	-2.87	-1.84
1995, 2000	0.49	-0.12	0.61	-2.05	-3.05	1.00
Dom. Rep.						
1986, 2002	-11.75	-7.60	-4.16	-17.26	-11.15	-6.11
1986, 1996	-9.66	-6.00	-3.67	-12.11	-10.84	-1.27
1986, 1991	-4.07	-1.19	-2.88	-10.03	-9.82	-0.21
1991, 2002	-7.68	-6.01	-1.67	-7.24	-3.30	-3.93
1991, 1996	-5.59	-4.69	-0.90	-2.09	3.51	-5.60
1996, 2002	-2.09	-1.51	-0.58	-5.15	-3.51	-1.64
Guatemala						
1987, 1999	-16.15	-15.16	-0.99	-10.79	-8.97	-1.82
1987, 1995	-12.03	-11.28	-0.75	-9.83	-8.85	-0.98
1995, 1999	-4.13	-3.01	-1.11	-0.96	-6.49	5.53
Nicaragua						
1997, 2001	-5.69	-4.42	-1.26	2.17	6.66	-4.50
Peru						
1986, 2000				-13.83	-8.92	-4.90
1986, 1996				-8.43	-0.12	-8.31
1986, 1992				-8.61	-0.12	-8.49
1992, 2000	-4.87	-3.15	-1.73	-5.22	-3.28	-1.94
1992, 1996	-3.84	-3.41	-0.43	0.18	1.52	-1.34
1996, 2000	-1.03	0.32	-1.34	-5.40	-1.52	-3.87

the redistribution component contributed significantly to the improving headcount ratios. For example, more than one-quarter of the 12-percentage point drop in the headcount ratio between 1986 and 1995 in Colombia was due to a shift in the distribution component, holding the mean constant. Similarly, of the nearly 10-percentage point drop in the stunting headcount in Dominican Republic between 1986 and 1996, nearly 40 percent can be explained by a favorable shift in the distribution of standardized heights. In general, though, even though health inequality is declining in these countries, most of the reduction in stunting rates is attributable to shifts in the mean of the distribution, not reduced dispersion.

The decomposition of the marked improvements in the schooling headcount indicator displays a much greater contribution of the distributional component to the reduction in the level of education poverty. As shown in Table 3, there are several cases where the marked overall improvement in the share of persons with primary education is mostly attributable to changes in the shape of the distribution, rather than to the increase in the overall means. For example, the distribution component explains more than two-thirds of the decline of education poverty from 55.63 to 49.10 percent in the case of Bolivia between 1989 and 1994. A similar proportion of the improvement is attributable to the distribution component in Colombia between 1986 and 1990, and in the case of Peru, the decline in school poverty between 1986 and 1992 was virtually all due to a shift in the shape of the distribution. In other cases, most of the improvement is due to the shift in the mean. In the Dominican Republic, for example, between 1986 and 1991, there was a 10.03 percentage point improvement in the education poverty level, of which 9.82 percentage points is based on the growth component. Another example of where the improvement in mean education, rather than the distribution component explains virtually all the decline in education poverty is Guatemala for all the time intervals for which we have data.

V. Discussion

A resurgence of interest in income inequality in Latin America has been fueled by the disturbing indications that both the economic crisis and subsequent policies to reform the economies in the region have contributed to worsening economic inequality. Furthermore, inequality has been increasingly viewed as a major reason for the failure to reduce poverty in the region. While the evidence is persuasive that income inequality is high, and that it contributes to perpetuating poverty, this literature ignores the fact that income inequality and income poverty are not

necessarily the only, or even the best measures of economic and social inequality and progress. Instead, there are good reasons to consider poverty and inequality in a multidimensional context, recognizing that economic and social well-being are not fully captured by income alone. In this paper, we examine the levels, trends, and composition of health and education inequality in Latin America. Our findings are very different from the income inequality literature: during the late 1980s and 1990s, inequality measured in the health and education dimension fell, and this decline contributed to a substantial improvement in health and education indicators. Despite the well-documented lack of progress on incomes in Latin America, our results show significant progress in other dimensions of well-being in part being explained by declining inequality. This progress is important evidence of socioeconomic development in Latin America, evidence that a narrow focus on income distribution and income poverty alone misses.

This paper is primarily a descriptive exercise, not endeavoring to explain the evolution of living standards and inequality. The countries included in our sample have been mostly under democratic rule during the last two decades. This may in turn have contributed to the public provision of basic services and infrastructure, thereby partially explaining the outcomes we observe. So while we do not add to the scientific evidence in terms of explaining the evolution of living standards and inequality, our main concern is that there is a need to reconcile the difference between our findings and those in the income distribution literature. Careful explanations must be left to future research, but we offer some observations and speculations here.

A first, purely statistical, point of interest is that many aspects of well-being that are intrinsically important, including health and education, do not have the long rightward tail that is typical of income distributions. It is easy for this skew to affect income inequality, so use of incomes alone can focus attention on the difference between the richest people in the sample and everyone else, while a concern for socioeconomic development should naturally focus on the poorest. Bill Gates may be richer, healthier, and smarter than the rest of us, but he has a disproportionate impact only on the distribution of income, not health or education, because the distribution of heights and years of schooling do not have a rightward skew. For health, this reflects the biology that at some point, children are growing adequately and additional inputs into the health production process will not increase stature. For education, there is a limit to how many years of formal education a person can accrue. A related explanation is that the income-health and income-education relationships are expected to be concave functions. This implies that

improvements in incomes will be associated with improvements in health and education, but that these will taper off quickly. By implication, even relatively small improvements in a population's welfare can compress its height and education distributions significantly if it starts from a very low level. Part of the explanation for the differences in the evolution of income and other indicators of inequality reflect the fact that the underlying factors that determine income inequality are different from those that contribute to health and education inequality. For example, income inequality is undoubtedly explained by the nature of the labor market; the role of non-earned incomes, including the large flows of remittances from overseas workers; the distribution of productive assets; and the differential returns to human capital. In contrast, education and health inequality largely reflect public provision of basic services and social infrastructure. The availability and access to these institutions may have little relationship to the underlying distribution of incomes. Progress in the provision of public services and the focus of public spending on the left hand side of the distribution may therefore explain why inequality in health and education is declining, concurrent with improvements in the level of poverty defined along these dimensions, despite worsening income inequality and stagnant or worsening levels of income poverty.

We close by emphasizing that we are not capturing all non-income dimensions of well-being, or for that matter, all relevant aspects of health and education. Our results on health are based on the health of children, which might differ from adults' experiences. In the case of education, our measure of well-being fails to account for changes in the quality of schooling over time. While we have no *a priori* expectations about how other measures of well-being might have changed in Latin America during the 1990s, we recognize that they may not be consistent with our health and education results here, so we must be appropriately cautious in generalizing from the limited dimensions over which we conduct our analysis. This implies a need to further consider other indicators of well-being, as well as to gain a fuller understanding of the processes that contribute to differences in income versus other indicators of inequity and poverty. However, the bottom line of this research seems clear: the evolution of income inequality in Latin America during the 1980s and 1990s is much different than the evolution of some other non-income indicators of inequality.

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