The Incidence of Recent Child Health Improvements

David E. Sahn, Cornell University
Stephen D. Younger, Ithaca College*

August, 2014

ABSTRACT

Economic growth has accelerated over the past 10–15 years in many poor countries, especially in Africa. This is welcome news that is widely discussed, including in the popular press. But even as economies grow, some analysts have expressed concerns that such growth is not having as significant an impact on poverty as one would hope. Analysts and policymakers are asking whether this growth is adequately pro-poor, shared, or inclusive. Less noticed is the fact that improvements in children's health are accelerating, too. This paper examines the extent to which these health improvements are equitably shared or "inclusive." We propose a descriptive method for this analysis that is analogous to growth incidence curves and apply it to seven countries from Africa, Asia, and Latin America over the past two decades. We draw two principal conclusions. First, within countries, health improvements often have a different distribution than income/expenditure growth, and that distribution is usually more hopeful in the sense that it is more likely to be relatively pro-poor than the distribution of income growth. Second, we have yet to see clear patterns in terms of the within-country relationship between growth incidence curves and health improvement incidence curves. Thus, one cannot rely on the information in the growth incidence curve alone to infer the inclusiveness of health improvements.

*Contact author: sdy1@cornell.edu.

The Incidence of Recent Child Health Improvements

INTRODUCTION

This paper sits at the intersection of two important literatures about improving living standards and poverty reduction. The first literature addresses the distribution of income growth. Many developing countries have enjoyed an acceleration of economic growth over the past 10–15 years, welcome news that is widely discussed, including in the popular press (*The Economist* 2011; African Development Bank 2012). But even as economies grow faster, some analysts have expressed concerns that such growth is not having as significant an impact on poverty as one would hope because it is disproportionately concentrated among the better off. Such concerns for "pro-poor growth" or "shared growth" or "inclusive growth" lead to a closer examination of the distributional consequences of recent economic growth (African Development Bank 2012; Kimenyi 2006; Younger 2013).

The second literature concerns poverty or welfare as a multidimensional phenomenon. In recent years, Sen's widely accepted theoretical argument that poverty must be understood as deprivations in multiple dimensions of well-being has found a variety of empirical approaches and applications (Sen 1976; Alkire and Foster 2007, 2011; Duclos, Sahn, and Younger 2006 a,b). While economic growth is welcome, and pro-poor growth even more so, improvements in incomes are not synonymous with poverty reduction or improved living standards. Broad measures of improvements in living standards must consider welfare in multiple dimensions.

Our purpose here is to consider the extent to which improvements in children's health are distributionally progressive, or pro-poor. We choose this particular dimension of well-being because, like incomes, there has been a marked acceleration of improvements in children's health in the past 20 to 30 years. Table 1 gives trends in infant mortality and children's heights and weights over the past four decades, based on simple averages of countries in sub-Saharan African, South Asia, and South America. In Africa, infant mortality has improved throughout, though the reductions decelerated in the 1990s and accelerated in the 2000s. Both stunting and underweight actually worsened in the 1990s before returning to improvements in the 2000s.[1] For all three indicators, the share of countries showing an improvement increases noticeably in the past decade. In South Asia and South America, improvements have been steady throughout the period.

[1] There are not enough countries with anthropometry data in the 1970s to include in the table.

Table 1 – Improvements in Children's Health in Africa, 1971-2011

Decade	IMR	Share of countries reducing IMR	Stunting	Share of countries reducing stunting	Underweight	Share of countries reducing underweight
			Africa			
1970s	117					
1980s	100	0.94	0.39		0.23	
1990s	89	0.90	0.41	0.42	0.24	0.39
2000s	72	0.96	0.38	0.68	0.22	0.61
			South Asia			
1970s	113					
1980s	89	1.00	0.57		0.49	
1990s	66	1.00	0.48	1.00	0.42	1.00
2000s	46	1.00	0.39	1.00	0.34	1.00
			South America			
1970s	65					
1980s	46	1.00	0.28		0.10	
1990s	32	1.00	0.21	0.88	0.07	1.00
2000s	21	1.00	0.18	0.88	0.05	1.00

Source: World Development Indicators

Notes: All statistics are unweighted averages across countries.
Only countries with data in all three decades (four for IMR) are included in the calculations.
Data are decadal averages for each country.
2000s include up to 2011.
Height and weight data are sparse before 1990 and may include only one observation per decade.
IMR is infant deaths per 1000 live births.
Stunting and underweight measure the share of children under 5 years old who are more than two standard deviations below the median of the WHO reference population.

As with growth, these improvements are encouraging, though they have received much less attention (see Demombynes and Trommlerova (2012) and WHO (2013)). It is also important to understand *whose* health is improving. In particular, to what extent can we say that these gains are "pro-poor" or "inclusive?" This paper addresses such distributional concerns, focusing on two questions. The first is to address how health improvements are distributed, both across the income distribution and across the health distribution. The second is to determine whether there is a similar pattern in growth incidence curves for income (or, more precisely, expenditures) and health incidence curves. That is, are changes in the distribution of expenditures and health similar to each other? One reason to expect that this would be the case is that there is a static correlation between income and health. But, this does not necessarily say much about whether there is a relationship between the distributions of *improvements* in income and health across the population.

METHODS

Ravallion and Chen (2003) propose a simple and elegant tool for examining the extent to which economic growth is pro-poor, the growth incidence curve. For a cumulative distribution of incomes F(y), let p be the quantile associated with a given income so that p = F(y). p ranges from 0 (the poorest quantile) to 1 (the richest). Inverting this gives a quantile function, $y(p) = F^{-1}(p)$. The growth incidence curve (GIC) is:

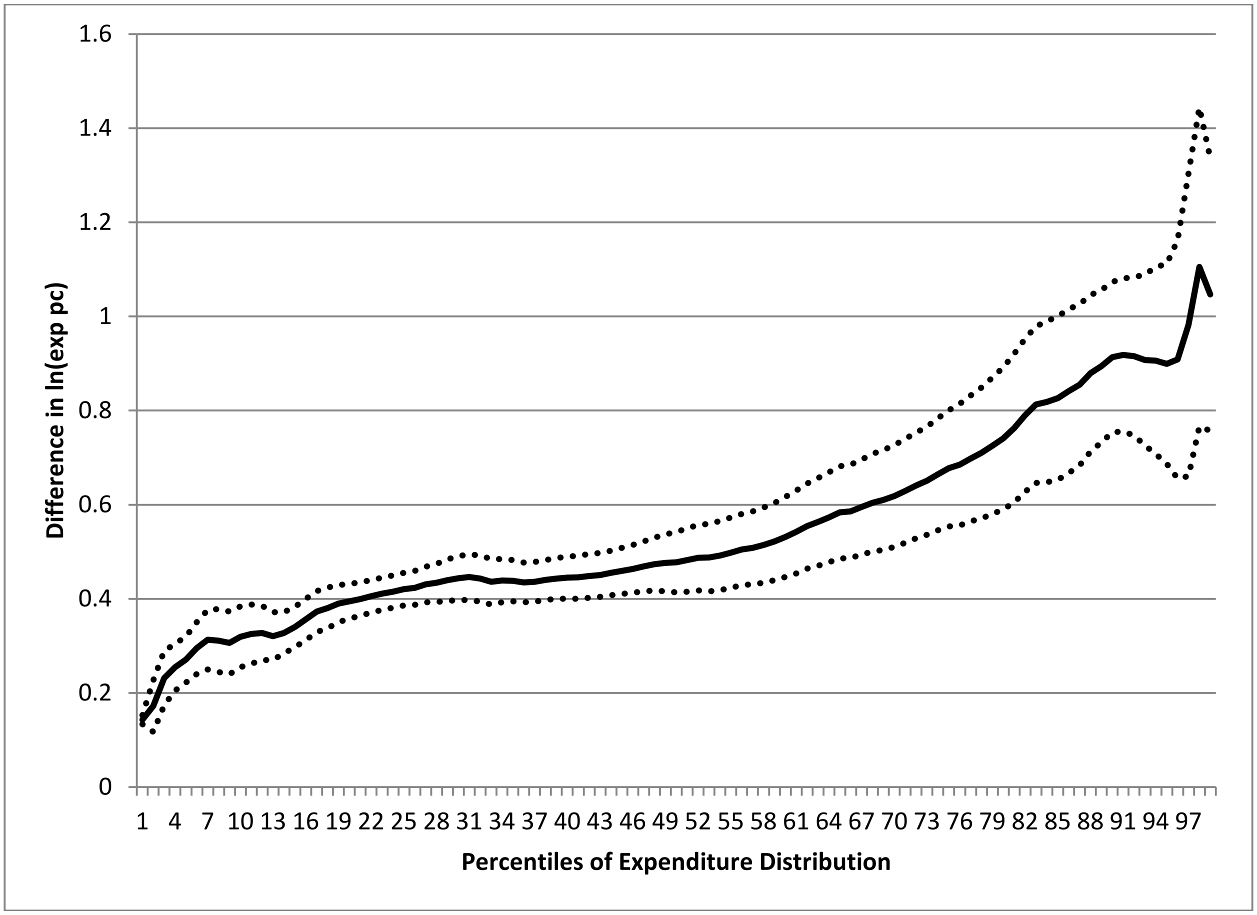
$$g_t(p) = \frac{y_t(p)}{y_{t-1}(p)} - 1 \qquad (1)$$

This curve shows how much income at the p^{th} quantile has grown at time t, graphing it for all values of p. Note that the GIC does not require panel data. We only need to know the income associated with the p^{th} quantile at each point in time,[2] so consecutive cross-sections are sufficient. Estimating $y_t(p)$ is straightforward, requiring only that we order the data from poorest to richest and identify the income at each quantile.

Figure 1 gives an example for Uganda. Household expenditure per capita increased throughout the expenditure distribution in these two decades, but the increase was considerably larger at the higher quantiles.

[2] This is consistent with the symmetry axiom for poverty measures.

Figure 1 – Growth Incidence Curve for Uganda, 1988 to 2011



Source: Authors' calculation, Uganda Integrated Household Survey, Uganda Panel Household Survey, and Demographic and Health Surveys.

The growth incidence curve has several straightforward and useful properties (Ravallion and Chen 2003):

- if $g_t(p)$ is constant for all p, then growth is uniform across the income distribution. The Lorenz curve remains unchanged as do most scalar measures of inequality;
- $g_t(p)$ is greater than average growth if and only if $y_t(p)/\mu$ increases over time: incomes at quantile p can only grow more than average if quantile p's share of overall income increases;
- if $g_t(p)$ is a decreasing (increasing) function for all p then inequality falls (rises) over time for all inequality measures satisfying the Pigou-Dalton transfer principle; and
- if the GIC is positive everywhere, then there is first-order dominance of the distribution at date t over t-1, and vice-versa.

Whether or not a GIC such as Uganda's constitutes "pro-poor" growth is debated. Ravallion and Chen (2003) take an "absolute" approach, arguing that because incomes of the poor grew unambiguously, the growth was “pro-poor.”[3] Other authors prefer a relative definition of “pro-poor” growth, arguing that not only should the incomes of the poor grow, they should grow by more than those of the rich, i.e., inequality should decline.[4] That is clearly not the case in Uganda for the past two decades. Regardless of which definition one prefers, the GIC is a useful tool for summarizing the distribution of income growth.

By strict analogy, we can generate health improvement incidence curves (HIICs) by replacing income with a measure of health, e.g., children’s height:

$$dht_t(p) = \frac{ht_t(p)}{ht_{t-1}(p)} - 1 \tag{2}$$

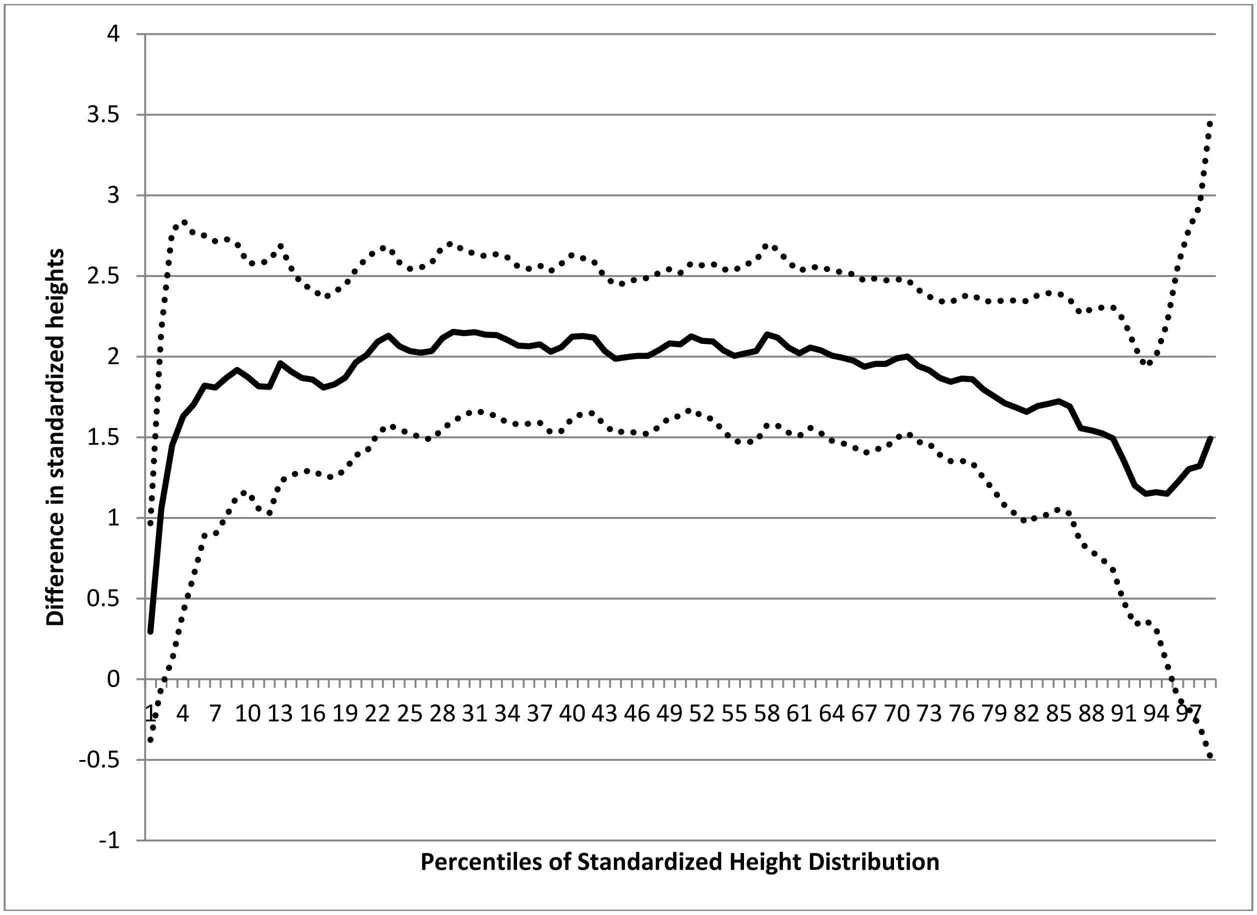
where $ht_t(p)$ is the height at the p^{th} quantile of the height distribution at time t, though it is probably easier to interpret the change in absolute terms for height, with the result measured in centimeters:

$$dht_t(p) = ht_t(p) - ht_{t-1}(p) \tag{3}$$

All of Ravallion and Chen’s welfare arguments follow for this curve if we take height as a measure of well-being.[5] Figure 2 gives an example. Except for the extreme quantiles, the distribution of height gains has been fairly uniform across the height distribution in Uganda.

[3] Ravallion and Chen (2003) use the Watts index as a social welfare function to arrive at this definition.
[4] Araar et.al. (2009) give a thorough review of both approaches.
[5] Switching to the absolute difference in Equation 3 requires using the FGT(1) poverty index rather than the Watts index.

Figure 2 – Growth Incidence of Children's Heights, Uganda, 1988 to 2011



Source: Authors' calculation and Demographic and Health Surveys.

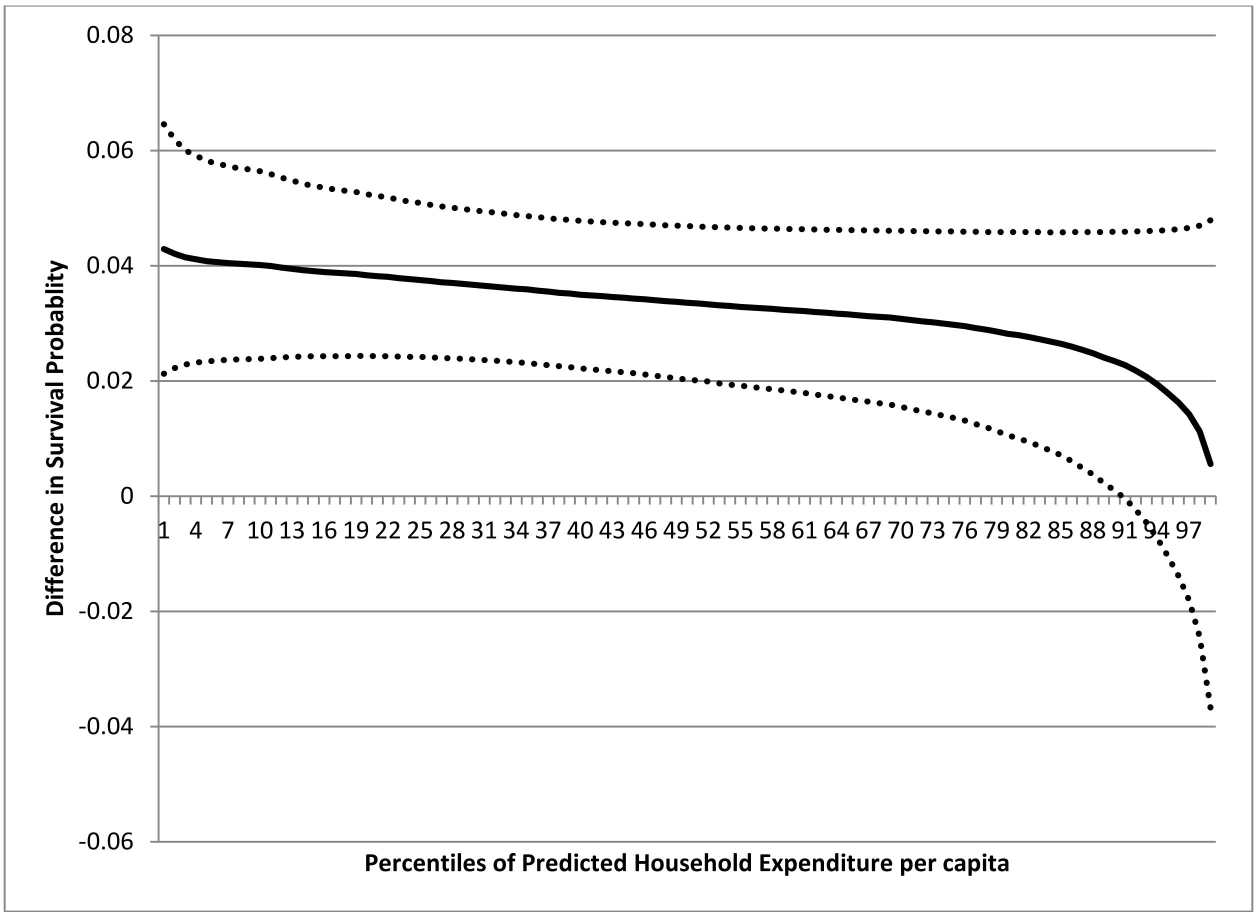
Even though this application is straightforward, it may not reflect policymakers' most important distributional concern. Instead, one might want to know about the distribution of heights across the income distribution. That is, are height gains larger for children in income poorer or richer households? We can answer that question with a "gradient health improvement incidence curve (GHIIC)":

$$dght_t(p) = ht_t(y_t(p)) - ht_{t-1}(y_{t-1}(p)) \tag{4}$$

where $ht_t(y_t(p))$ is the height associated with the p^{th} quantile of the income distribution rather than the height distribution. Estimation of $ht_t(y_t(p))$ requires a regression, which we do nonparametrically using local linear regression. The difference between Equations 3 and 4 is analogous to the univariate vs. gradient approach to health inequality (Pradhan, Sahn, and Younger 2003; Sahn and Younger 2006), but here, we are examining changes in health status rather than its level.

This GHIIC curve does not have the clean welfare economics interpretation of the growth incidence curve or the HIIC—its associated welfare function would have to be multivariate as would judgments about changes in that welfare—but it does yield answers to the question posited in the preceding paragraph: where in the income distribution are heights improving, and by how much. Another advantage of this approach is that the measure of health can be discrete, such as infant mortality. For such a measure, there could not be a univariate HIIC, because the mortality distribution has just two mass points at 0 and 1 (infant death and infant survival). But it is possible to regress infant mortality (or survival, to keep the welfare-improving derivative positive) on income and graph the resulting estimated probabilities against the quantiles of the income distribution.

Figure 3 - Growth Incidence of Infant Survival in Uganda, 1988 to 2011



Source: Authors' calculation, Uganda Integrated Household Survey, Uganda Panel Household Survey, and Demographic and Health Surveys.

Figure 3 gives an example for infant survival. Here, the probability of surviving to one's first birthday has increased across the entire income distribution, with the largest gains at the lowest income quantiles. Thus, in both absolute and relative terms, these gains are "pro-poor."

DATA AND VARIABLES

The best sources of child health indicators over extended time periods in developing countries are the Demographic and Health Surveys. We focus on children's heights and infant survival because those variables are available from the very first DHS, circa 1990, up to the present, allowing us the longest perspective possible.[6] That infant survival is a measure of well-being seems obvious. Children's heights are recognized as a good general measure of health of pre-school age children and serve well as a measure of children's health histories.[7] We have not used under-five mortality because that would require using only children older than five to avoid the censoring problem. That both reduces the sample size (which matters for the very imprecise mortality regressions) and requires us to associate mortality more than five years prior to the survey with incomes at the survey date. We have also not used children's weight because increased weight does not unambiguously indicate improved health.

The main problem with the DHS for our purposes is that they do not collect income or expenditure information. To deal with that, we have used income and expenditure surveys from the same countries to predict household expenditure per capita. This involves regressing the log of expenditures per capita on a set of variables that are available in both the income/expenditure survey and the DHS. These include household ownership of certain durable goods, characteristics of the household's dwelling (roof, wall, and floor materials; access to electricity), the household's source of drinking water and type of toilet facility, and the education of the child's mother[8] and the household head. We then use the resulting coefficient estimates to predict the log of household expenditures per capita in the DHS data.[9]

In Uganda, we matched each DHS survey to an income/expenditure survey that was done as close to the same time as possible: the 1988 DHS to the 1992 Income and Expenditure Survey; the 2000 DHS to the 1999 National Household Survey; and the 2011 DHS to the 2009 Panel Household Survey. We found, however, that it made little difference to our results if we used only the 2009 Panel Household Survey to estimate the expenditure prediction function to apply to each DHS. In the other countries, then, we use only one income/expenditure survey,[10] which is convenient because in some countries we cannot easily match DHS to income/expenditure surveys temporally.

---

[6] More recent surveys have further indicators of interest, including hemoglobin measures for children and their mothers and maternal mortality measures. We will explore these in future work.

[7] Pradhan, Sahn, and Younger (2003) have an extended discussion of height as a measure of well-being.

[8] Most income and expenditure surveys do not allow us to identify the mother(s) of the children in the household, so we define a "main female" in this order: the spouse of the household head; the sister of the household head, in order of age; the mother of the household head; any other adult female, in order of age. This person's education level is matched to the mother's in the DHS survey.

[9] The DHS do calculate an "asset index" by applying principal components to most of the indicators in our list. This is often used as a proxy for income. However, because each indicator is discrete, the resulting asset index is lumpy, blurring the calculation of fine quantiles. Our inclusion of the two years of education variables helps to make our measure much more continuous. It also gives it an interpretable scale, though that is not important for this analysis. We did compare parametric regressions of height, weight, and infant survival on the DHS asset index and our measure for Uganda, using polynomials of first to fourth order. Our measure has a larger R^2 in each instance.

[10] Appendix 1 lists all the surveys we have used.

To estimate the regression of health status on expenditures for the GHIIC, was use local linear regression, selecting the bandwidth with a cross-validation that minimizes the leave-one-out sum of squared errors.[11] We estimate the standard errors using a bootstrap that accounts for the sampling design of the DHS.

RESULTS

We have estimates for eight countries: Bangladesh, Cameroon, Colombia, Ghana, Madagascar, Malawi, Peru, and Uganda. We selected these based on their having DHSs available over roughly 20 years and accessible income/expenditure surveys. In the case of the Africa, we selected countries from Eastern, Western, and Southern Africa, as well as Francophone and Anglophone countries. In Figure 4, we first present the growth incidence curves, which while not our focus, we use as a source of comparisons with the gradient health improvement incidence curves. Uganda achieved the highest level of growth in per capita expenditure distribution across the two periods for which we have data. Although incomes improved among those in the lower end of the expenditure distribution, and thus there was pro-poor growth in absolute terms, this growth is not pro-poor in a relative sense since the incomes of the rich grew more than the incomes of the poor. Three other countries – Bangladesh, Colombia, and Ghana – show a similar but less extreme pattern, with growth throughout the income distribution, including for the poorest, but higher growth in the upper quantiles. For the other three African countries average growth is much slower, or negligible (especially in the case of Cameroon), and in none of these countries is it pro-poor in relative or absolute terms. In the cases of Madagascar and Malawi, the limited growth that occurred is concentrated in the upper end of the per capita expenditure distribution. In Malawi, for example, there is virtually no growth in per capita expenditures across 80 percent of the expenditure distribution; then there is a sharp upward slope of the curve indicating that there was measurable growth in expenditures among the wealthiest quantiles of the population. This is exactly the growth pattern that skeptics worry about. Of the eight countries, only Peru has significant growth over the period that is both absolutely and relatively pro-poor.

Next we present the GHIICs using children's heights and infant survival as our health measures (Figure 5). An important pattern runs through almost all of these countries: health improvement is more equitably distributed than income growth, especially in the economies with more income growth. There is almost no evidence of relatively "pro-rich" improvements in height or infant survival GHIICs; all of the GHIICs are either flat or downward sloping, including in the countries that have fast and relatively pro-rich growth in incomes.

The infant survival curves are not estimated very precisely, so it is difficult to reject that they are flat. Nevertheless, Ghana, Madagascar, and Peru all are unambiguously pro-poor in absolute and relative terms. Examining growth in heights, Ghana, Uganda, and Peru, all countries with rapid income growth, also show height improvements that are relatively and absolutely pro-poor. The only clear exception to the positive story about pro-poor health incidence is Cameroon where the curve is flat up to the 90th percentile with a relatively steep upward slope thereafter. Cameroon is

[11] We did truncate this bandwidth at 1, or a 100% difference in income, at the top end. Some of the infant mortality regressions want to use a very wide bandwidth, leading to essential linear regressions. This is probably because prediction of infant mortality is so imprecise.

also the only case with essentially stagnant income throughout the distribution. In a couple of other cases, the downward slope across most of the expenditure distribution is reversed at the upper end, a case in point being Uganda. In sum, the pro-poor nature of the GHIICs contrasts with the case for GICs, where pro-poor growth is quite rare.

A second important generalization from these figures is that all the countries except Cameroon and Colombia show clear evidence of absolutely pro-poor improvements in both infant survival and children's heights: all of the GHIICs are greater than zero at the lower quantiles of the expenditure distribution.

In considering this phenomenon, one possible explanation is that among the poor, the increased availability of health and related public health measures has allowed for an improvement in the health of the poor, even though their incomes and expenditures have not grown. This can be considered a success for the public and non-governmental organizations that deliver such services. It may also reflect greater returns to health spending for the poor.

The health improvement incidence curves (HIICs) in Figure 6 show a decidedly mixed picture. The non-African countries all have large increases in standardized heights across the entire distribution and the slopes down, indicating that these height improvements are both absolutely and relatively pro-poor. None of the African countries show the same pattern. While Ghana, Malawi, and Uganda do show positive growth at the shortest percentiles, Madagascar and Cameroon do not. None of the African countries have relatively pro-poor increases in height. Madagascar is an exceptional case with a strong upward slope in the HIIC reaching remarkably large height improvements, 6-7 centimeters, at the top end of the height distribution. Interestingly, the levels of malnutrition are highest in Madagascar, which may in part explain the large improvements shown, and although they are most concentrated at the upper end of the distribution, low height-for-age was found among those in the upper part of the distribution as well. The one country without marked improvements in the HIIC is Cameroon.

CONCLUSIONS

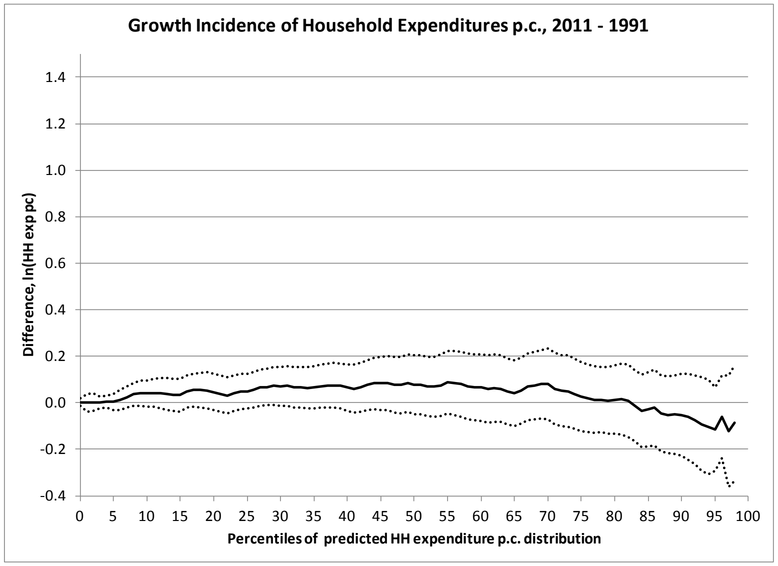
Economic growth has picked up in developing countries, a welcome fact. Nonetheless, concern remains over the distribution of the participation in this growth, particularly in developing countries where poverty and poor health remain formidable challenges. Similarly, the evidence is compelling that health improvements are widespread, including in countries that have not witnessed substantial improvements in economic performance. This presumably reflects the increased availability and utilization of health care services and public health measures, which often are not directly related to higher income or poverty reduction. But as with income poverty, there is a legitimate concern as to who is benefiting most from the improvements in health, the issue we take up in this paper. We develop a method to generate health improvement incidence curves (HIICs). These are analogous to growth incidence curves but replace data on changes in expenditures with two measures of health—infant survival probabilities and child heights—where the ordering of well-being is also the health indicator itself. Additionally, we develop the concept of the "gradient health improvement incidence curve (GHIIC)" to address whether the height gains are larger for children in *income* poorer or richer households. The difference between HIICs and GHIICs is similar to the univariate vs. gradient approach to health inequality, but, here, we are examining inter-temporal changes in health rather than health status itself.

Our results deliver a clear and important message to those concerned with multi-dimensional poverty reduction: one cannot limit the analysis to income alone—the distributional benefits of income growth differ from those for health gains. In particular, while we find that economic growth over the spells we examine tends not to be pro-poor, the opposite is true for health, at least when we look at the change in the gradient between expenditures and health outcomes using the GHIICs. The story is more mixed when we adopt a univariate approach to health inequalities, as shown in the HIICs.

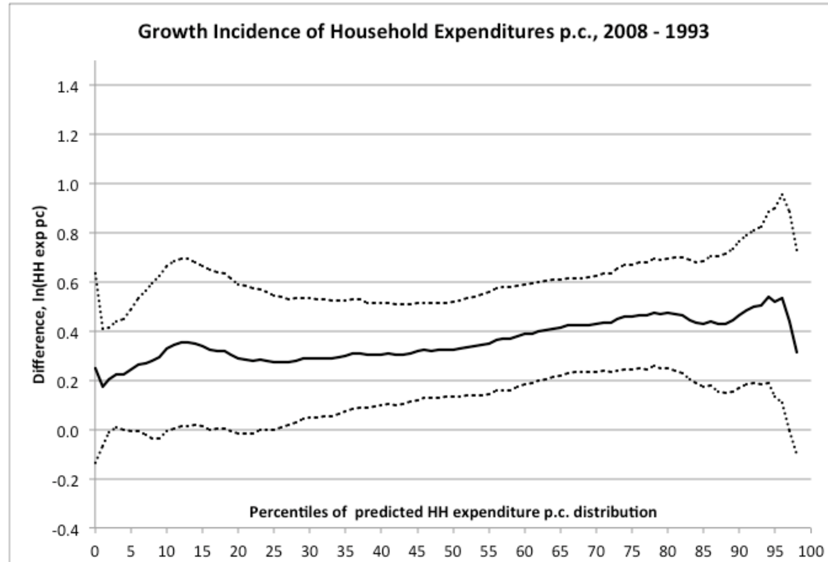
In looking at the results across different incidence curves for a given country, it is also clear that the relationship between the shape of the GIC, the HIIC, and the GHIIC is not consistent. Put differently, the incidence of income growth and health improvements is certainly not the same *within* a country. We therefore cannot predict what the health improvement curves will look like based on the growth incidence curves that economists and those concerned with income inequality usually examine. This reinforces the lessons we have argued for in our earlier work (Duclos, Sahn and Younger 2006 a, b) that poverty is a multidimensional phenomenon. The method we have developed gives a fuller picture of how improvements in one non-income dimension of well-being, child health, is distributed across both income and health distributions.

Figure 4 – Growth Incidence Curves (GIC)

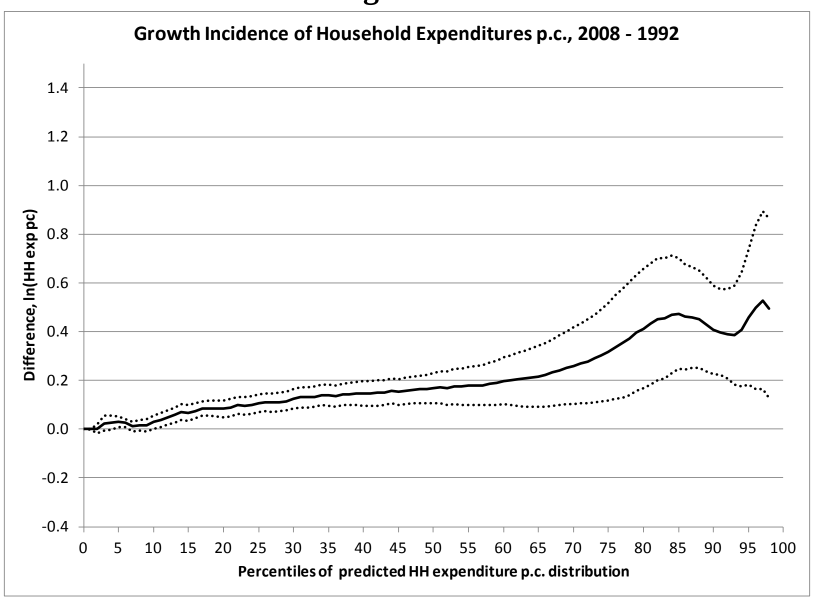
Cameroon



Ghana



Madagascar



Malawi

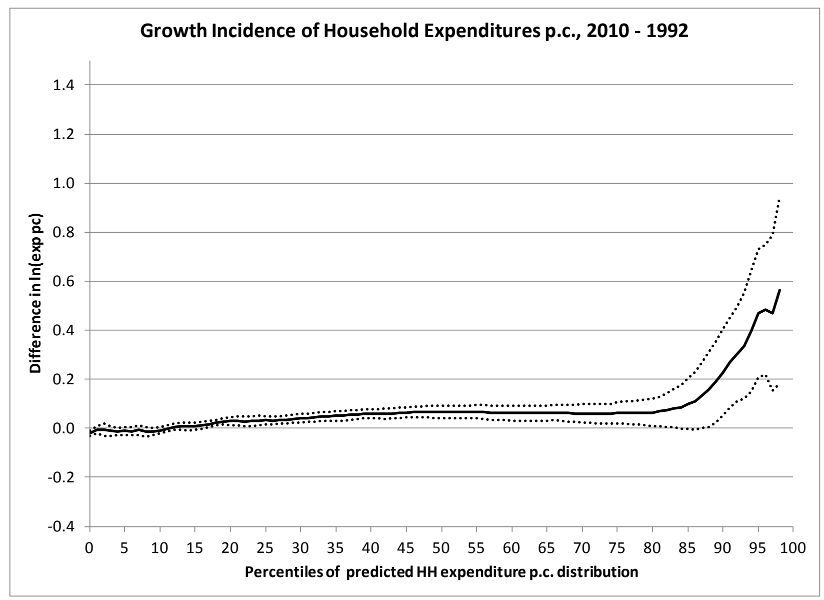
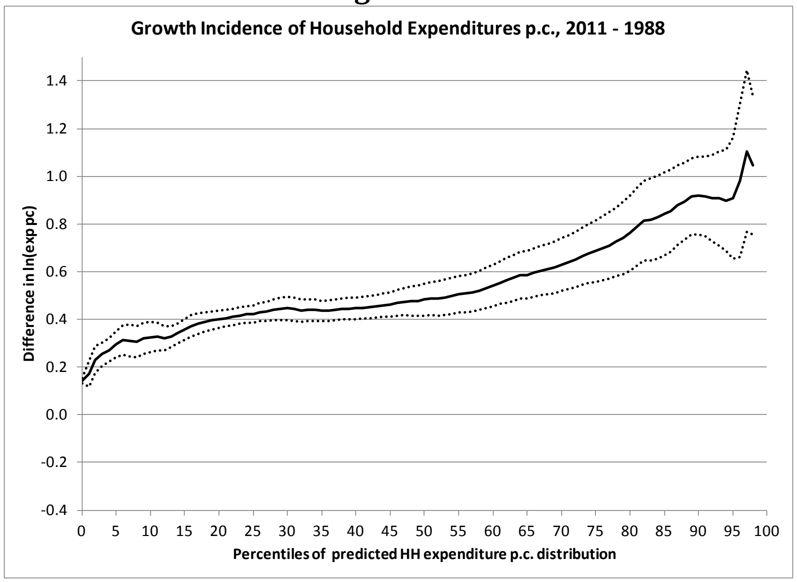
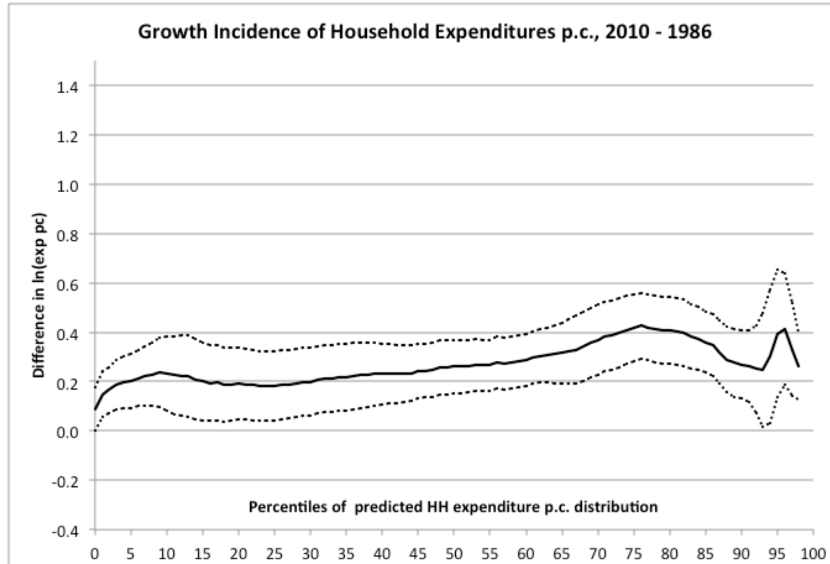


Figure 4 – Growth Incidence Curves (GIC) cont.

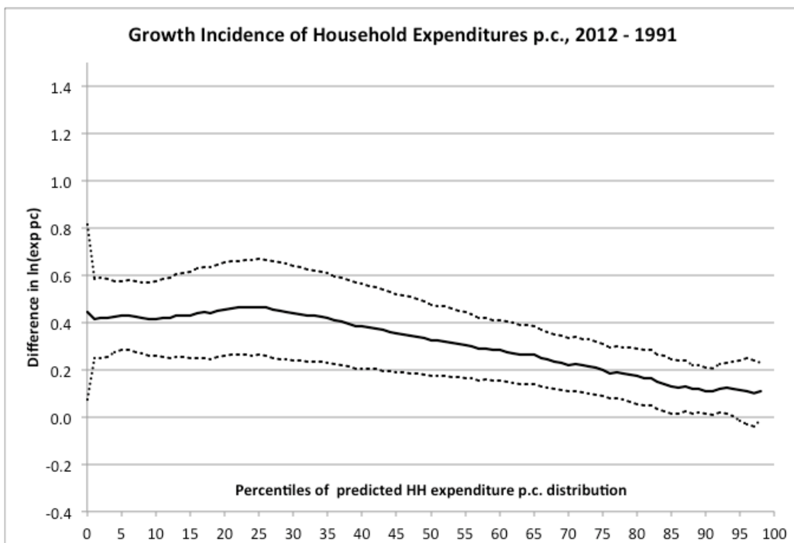
Uganda



Colombia



Peru



Bangladesh

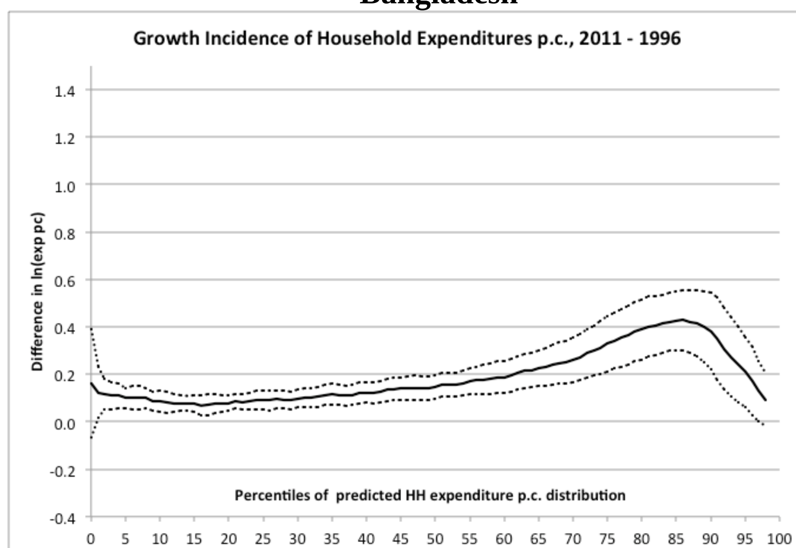


Figure 5 – Gradient Health Improvement Incidence Curves (GHIIC)

Cameroon **Ghana**

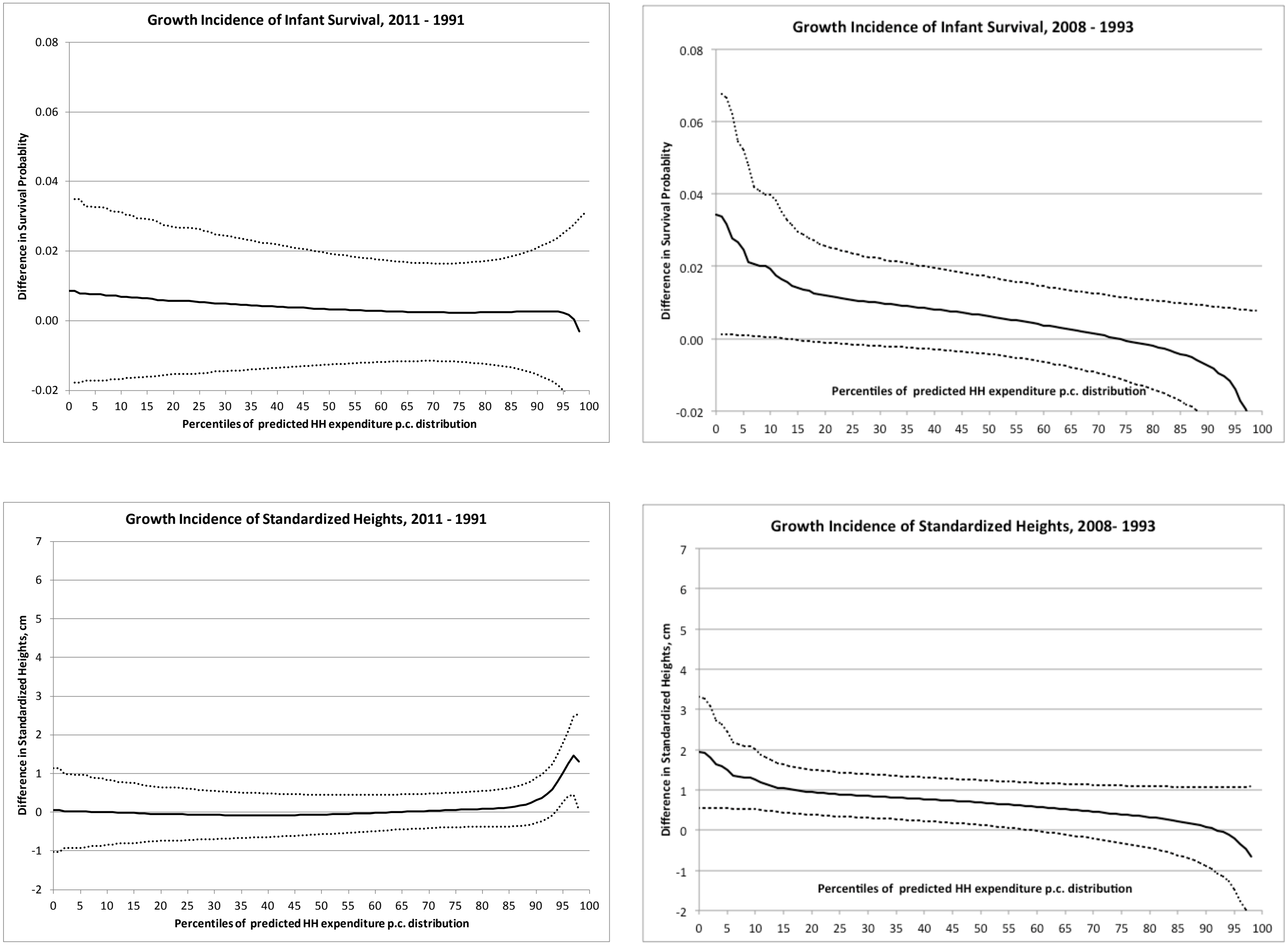
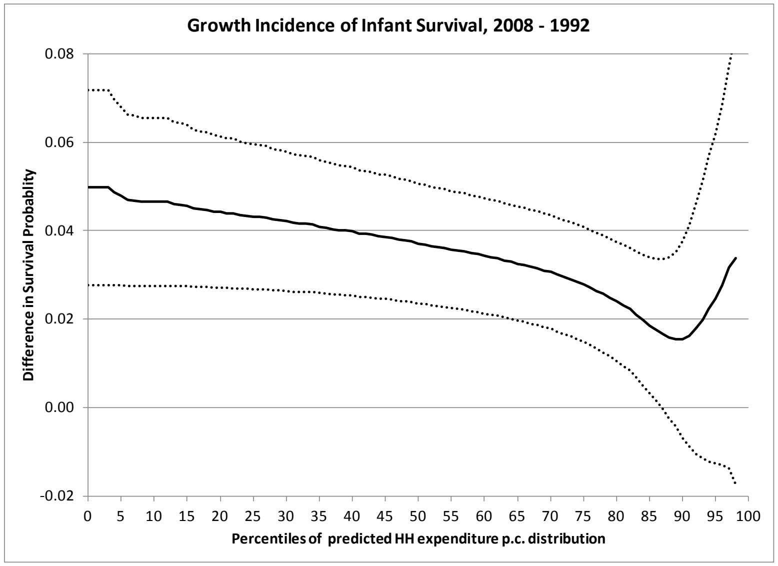
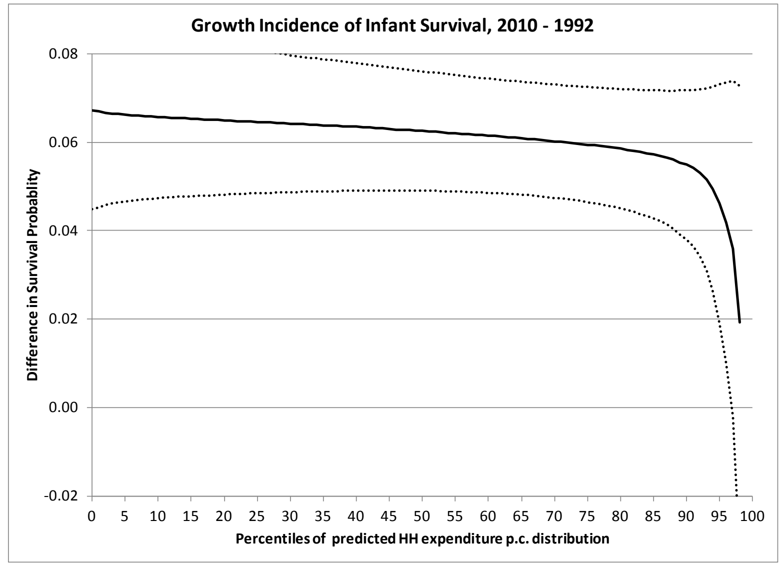


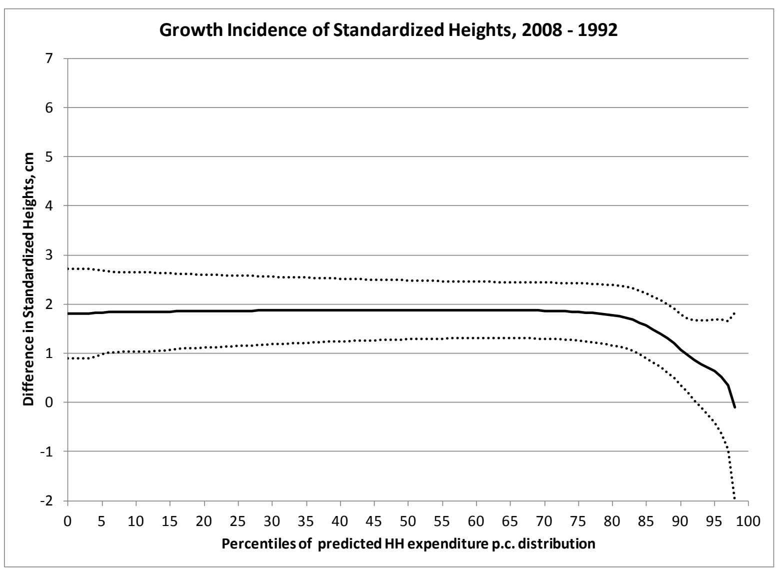
Figure 5 – Gradient Health Improvement Incidence Curves (GHIIC) cont.

Madagascar

Malawi







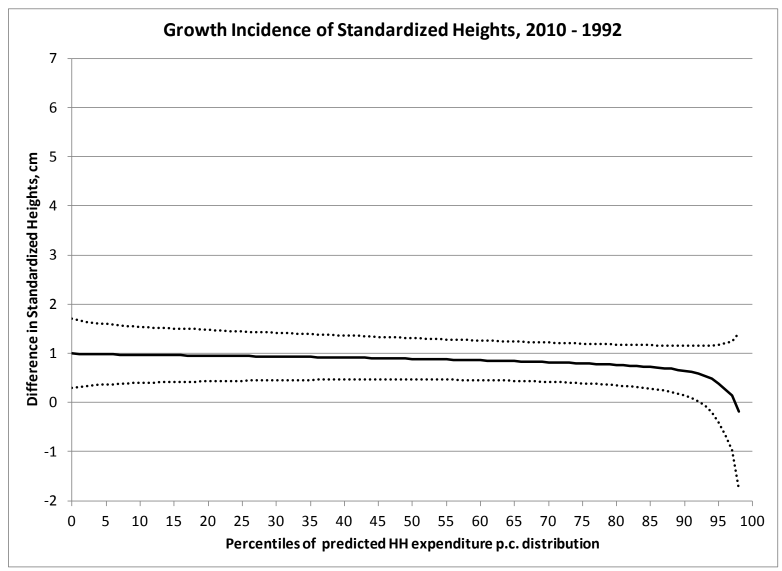


Figure 5 – Gradient Health Improvement Incidence Curves (GHIIC) cont.

Uganda

Colombia

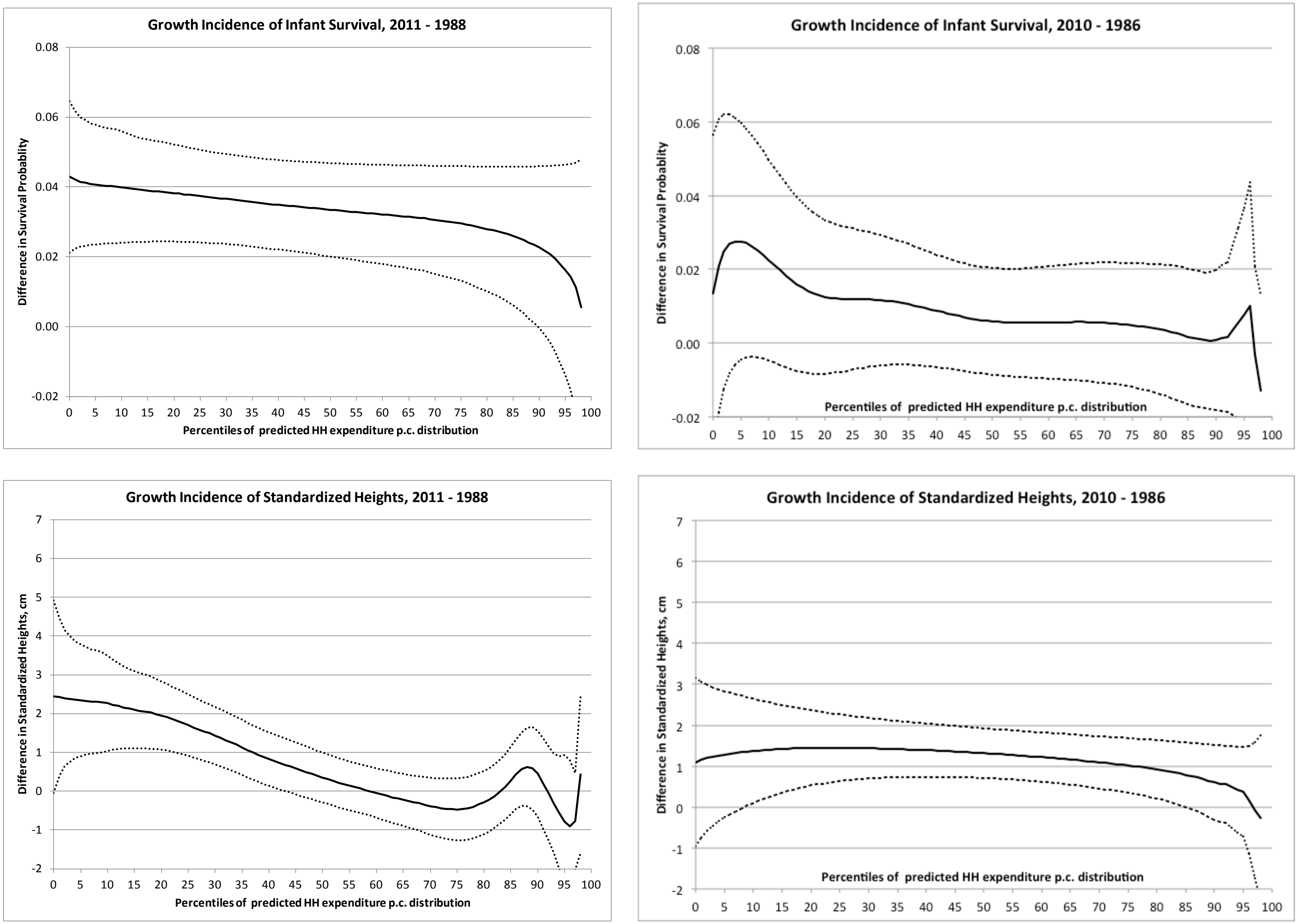
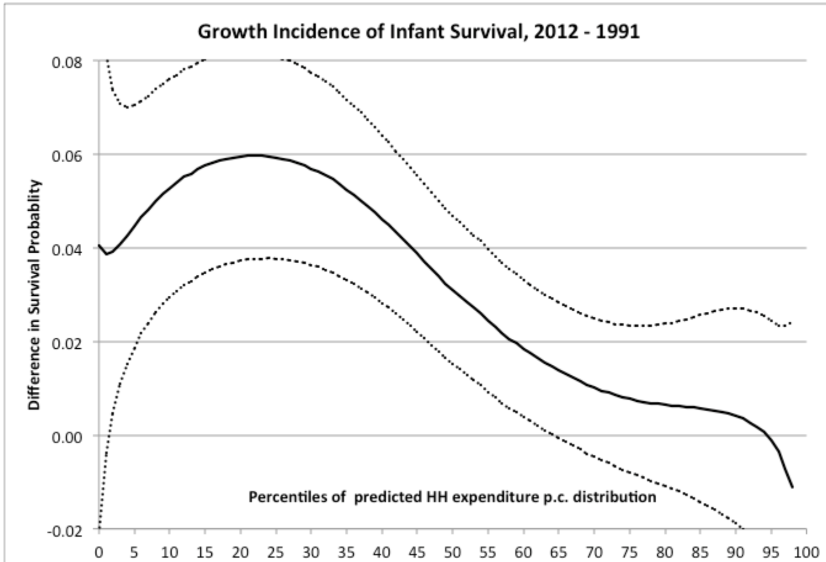
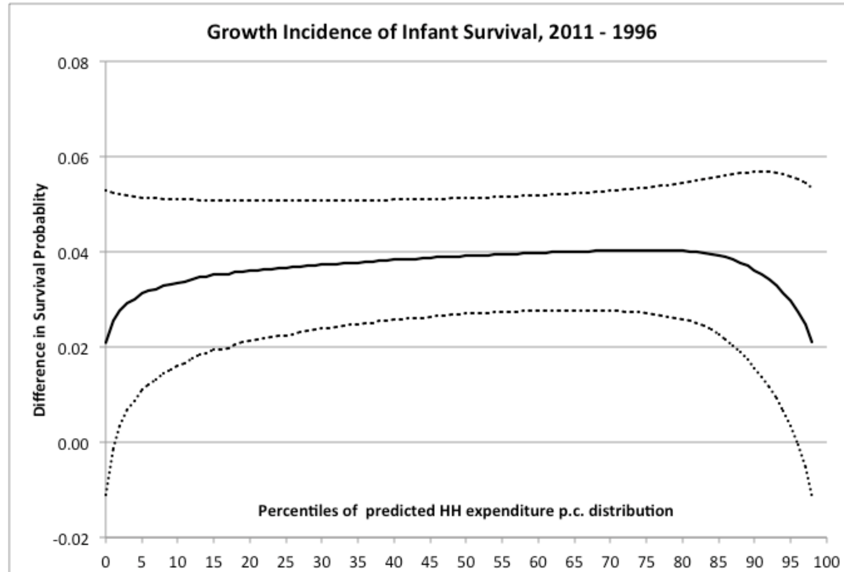


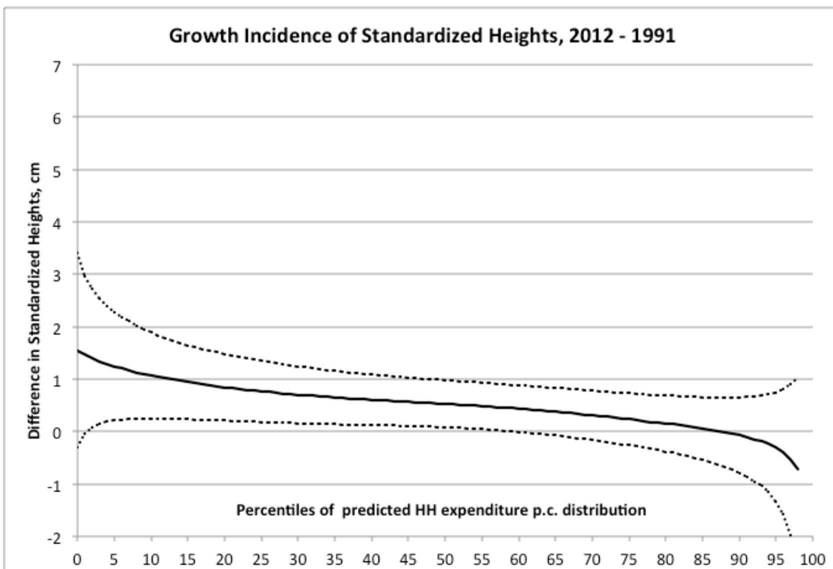
Figure 5 – Gradient Health Improvement Incidence Curves (GHIIC) cont.

Peru

Bangladesh







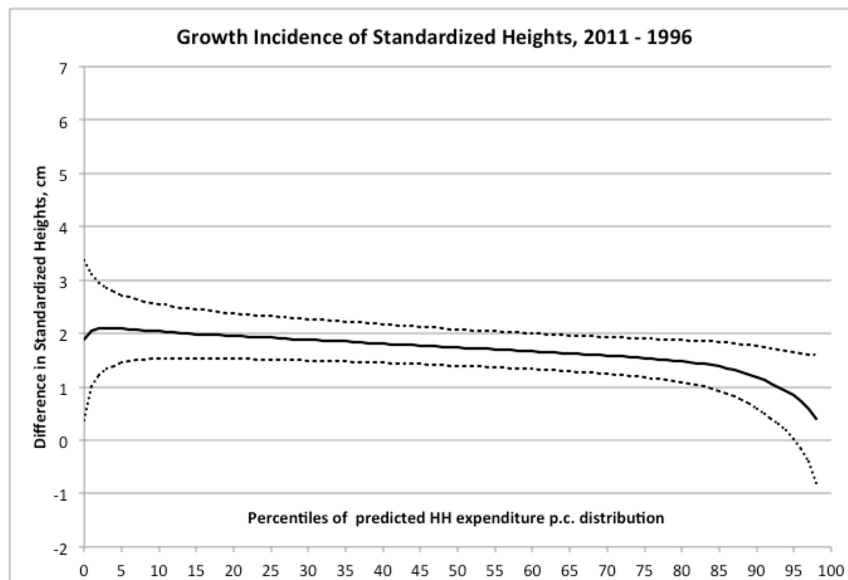
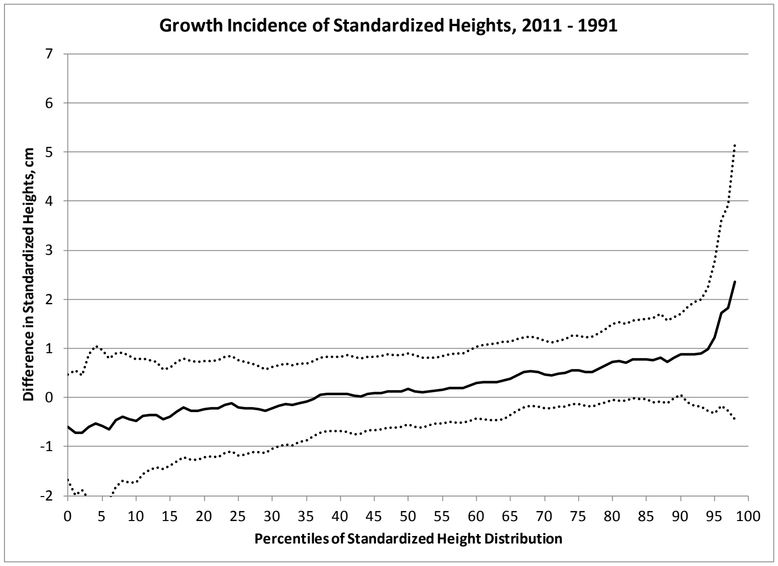
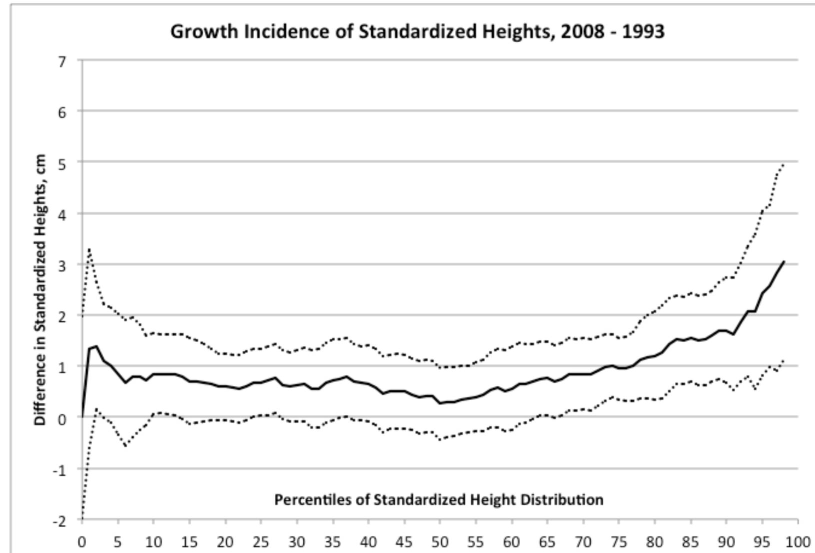


Figure 6 – Figure Health Improvement Incidence Curves

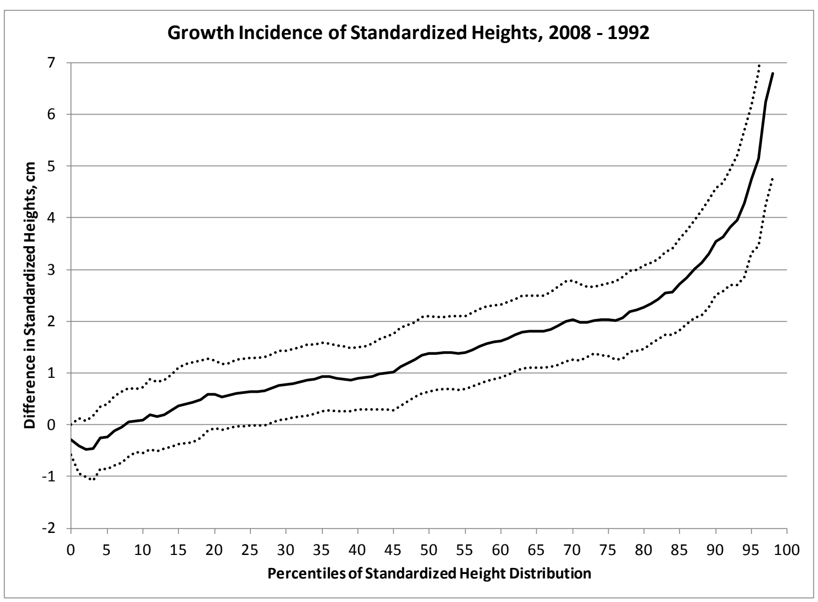
Cameroon



Ghana



Madagascar



Malawi

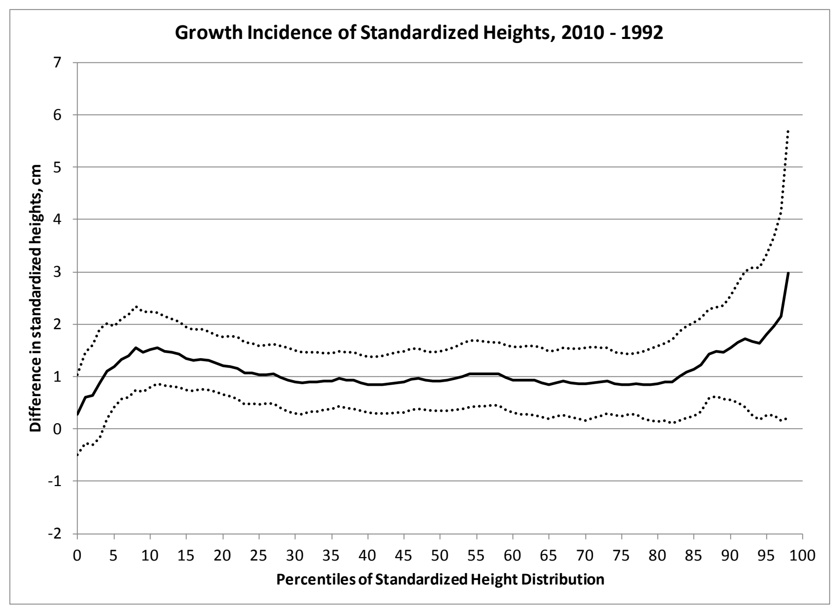
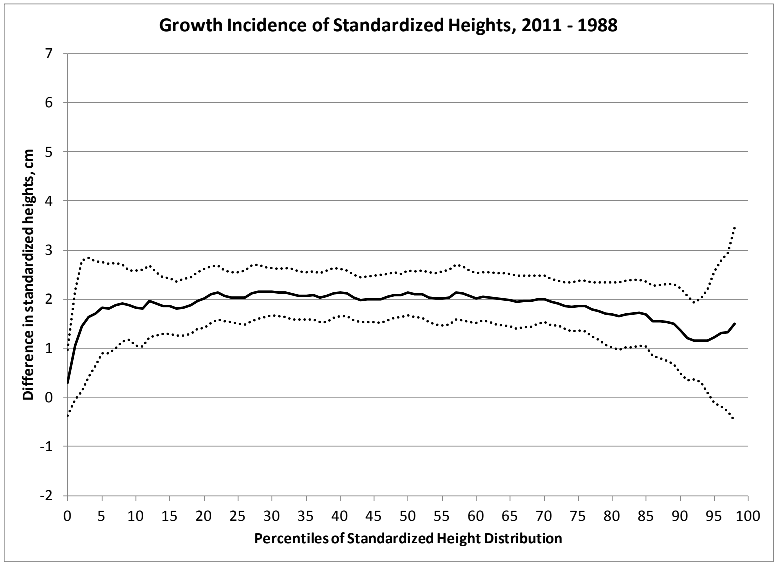
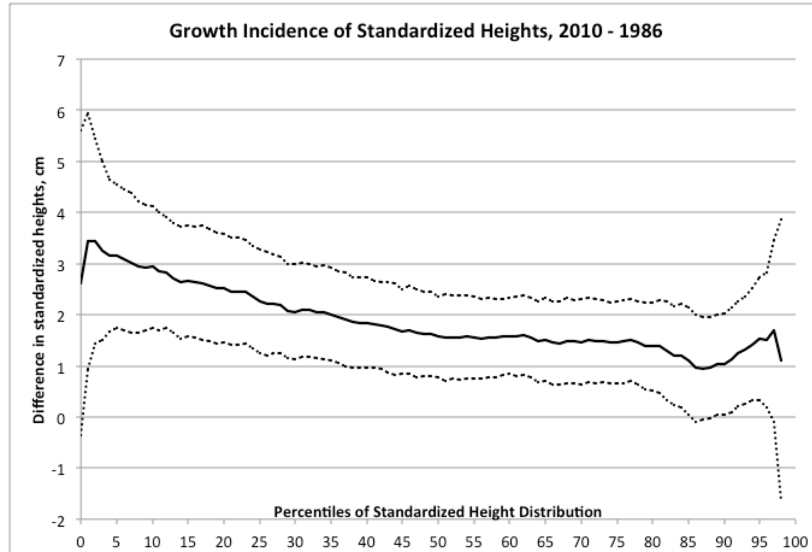


Figure 6 – Figure Health Improvement Incidence Curves cont.

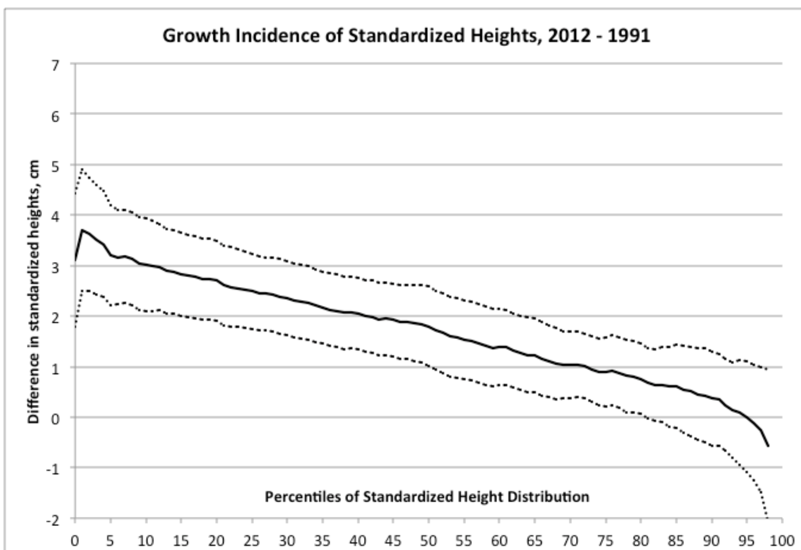
Uganda



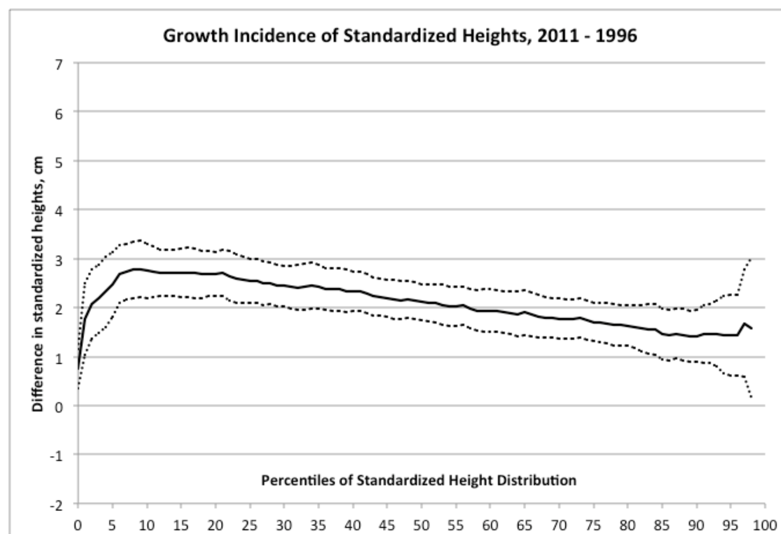
Colombia



Peru



Bangladesh



APPENDIX Table A1. Survey Data

COUNTRY SURVEY	
Bangladesh	
DHS Surveys	http://dhsprogram.com/what-we-do/survey/survey-display-349.cfm http://dhsprogram.com/what-we-do/survey/survey-display-349.cfm
2011–12 Bangladesh Integrated Household Survey (BIHS)	http://thedata.harvard.edu/dvn/dv/IFPRI/faces/study/StudyPage.xhtml?globalId=hdl:1902.1/21266
Cameroon	
DHS Surveys	http://www.measuredhs.com/publications/publication-fr260-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-337.cfm (2011 Cameroon DHS) http://www.measuredhs.com/publications/publication-fr7-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-38.cfm (1991 Cameroon DHS)
Deuxieme Enquete Cameroun auprès des ménages ECAM2 (2001)	http://www.social-protection.org/gimi/gess/ShowRessource.action?ressource.ressourceId=14548
Colombia	
DHS Surveys	http://dhsprogram.com/what-we-do/survey/survey-display-4.cfm http://dhsprogram.com/what-we-do/survey/survey-display-381.cfm
2001 Encuesta Continua de Hogares	http://formularios.dane.gov.co/Anda_4_1/index.php/catalog/185

continued

COUNTRY SURVEY ***continued***	
Ghana	
DHS Surveys	http://dhsprogram.com/what-we-do/survey/survey-display-58.cfm http://dhsprogram.com/what-we-do/survey/survey-display-301.cfm
Ghana Living Standards Survey 1998/99	http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:21387157~pagePK:64168445~piPK:64168309~theSitePK:3358997,00.html
Madagascar	
DHS Surveys	http://www.measuredhs.com/publications/publication-fr236-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-296.cfm (2008 Madagascar DHS) http://www.measuredhs.com/publications/publication-fr50-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-49.cfm (1992 Madagascar DHS)
EPM Surveys (Enquêtes périodiques auprès des Ménages) 1993	http://www.gripweb.org/gripweb/sites/default/files/databases_info_systems/Madagascar EPM 1993.pdf
Malawi	
DHS Surveys	http://www.measuredhs.com/publications/publication-fr49-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-52.cfm (1992 Malawi DHS

continued

COUNTRY SURVEY ***continued***	
Malawi continued	
DHS Surveys *cont.*	http://www.measuredhs.com/publications/publication-fr247-dhs-final-reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-333.cfm (2010 Malawi DHS) http://go.worldbank.org/JR84NBDS70
Peru	
DHS Surveys	http://dhsprogram.com/what-we-do/survey/survey-display-44.cfm http://dhsprogram.com/what-we-do/survey/survey-display-434.cfm
2001 Encuesta Nacional de Hogares	http://www.inei.gob.pe/estadisticas/encuestas/
Uganda	
DHS Surveys	http://www.measuredhs.com/publications/publication-FR41-DHS-Final-Reports.cfm and http://www.measuredhs.com/what-we-do/survey/survey-display-27.cfm (1998 Uganda DHS) http://www.measuredhs.com/publications/publication-fr264-dhs-final-reports.cfm and http://www.measuredhs.com/data/dataset/Uganda_Standard-DHS_2011.cfm?flag=0 (2011 Uganda DHS)
1992 Income and Expenditure Survey	http://iresearch.worldbank.org/PovcalNet/doc/UGA.htm
1999 National Household Survey	http://go.worldbank.org/S233P3YC30

REFERENCES

African Development Bank. 2012. “Briefing Note 6: Inclusive Growth Agenda.” In Briefing Notes for the African Development Bank’s Long-Term Strategy.

Alkire, S., and J. E. Foster. 2007. “Counting and Multidimensional Poverty Measurement.” Oxford Poverty & Human Development Initiative (OPHI) Working Paper No. 7

Alkire, S., and J. E. Foster. 2011. “Understandings and Misunderstandings of Multidimensional Poverty Measurement.” *Journal of Economic Inequality* 9(2): 289–314.

Araar, Abdelkrim, Jean-Yves Duclos, Mathieu Audet, and Paul Makdissi. 2009. “Testing For Pro-Poorness Of Growth, With An Application To Mexico.” *Review of Income and Wealth* 55(4): 853–881.

Demombynes, Gabriel, and Sofia Karina Trommlerova. 2012. “What has driven the decline of infant mortality in Kenya?” Policy Research Working Paper Series 6057, The World Bank.

Duclos, Jean-Yves, David E. Sahn, and Stephen D. Younger. 2006a. “Making Multidimensional Poverty Comparisons.” *The Economic Journal* 116(514): 943–968.

Duclos, Jean-Yves, David E. Sahn, and Stephen D. Younger. 2006b. “Robust Multidimensional Spatial Poverty Comparisons in Ghana, Madagascar, and Uganda.” *World Bank Economic Review* 20(1): 91–113.

The Economist. 2011. “The hopeful continent: Africa rising.” Dec. 3, 2011.

Kimenyi, Mwangi S. 2006. “Economic Reforms and Pro-Poor Growth: Lessons for Africa and other Developing Regions and Economies in Transition.” Dept. of Economics, University of Connecticut, Working Paper #2006-02.

Pradhan, Menno, David E. Sahn, and Stephen D. Younger. 2003. “Decomposing World Health Inequality.” *Journal of Health Economics* 22(2): 271–293.

Ravallion, Martin, and Shaohua Chen. 2003. “Measuring pro-poor growth.” *Economics Letters* 78(1): 93–99.

Sahn, David E., and Stephen D. Younger. 2006. “Changes in Inequality and Poverty in Latin America: Looking Beyond Income to Health and Education.” *Journal of Applied Economics* IX(2): 215–234.

Sen, Amartya. 1976. “Poverty: An Ordinal Approach to Measurement.” *Econometrica* 44(2): 219–231.

World Bank. World Development Indicators. 2013. http://data.worldbank.org/data-catalog/world-development-indicators

WHO (World Health Organization). 2013. “Joint child malnutrition estimates (UNICEF-WHO-WB): Global and regional trends by WHO Regions, 1990–2012 Stunting.” Global Health

Observatory Data Repositoryhttp://apps.who.int/gho/data/node.main.NUTWHOREGIONS?lang=en

Younger, Stephen D. 2013. “Measuring Inclusive Growth in Africa.” Draft.