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Wealth Still Matters

A Study of Wealth Differentials in Primary School Attendance from 1990-2006 in Developing Countries

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A Study of Wealth Differentials in Primary School Attendance from 1990-2006 in Developing Countries [‡]

ABSTRACT

Around the world, there are differentials in children's school attendance by the wealth of the child's household. These differentials have been increasingly documented since the 1990s. This study examines changes in attendance differentials by wealth over time from 1990-2006 for 61 developing and transitional countries, based on household surveys. The level of inequality in attendance is calculated with a Gini coefficient. The study finds that:

- over the whole period there were school attendance differentials by wealth except in countries with universal attendance;
- these differentials have declined over time in almost all countries.

The decline in attendance differentials by wealth is an expected (and welcomed) result of overall increases in TNAR which are associated with more inclusion of poorer children. However, there also appears to be a real decline of attendance inequality by wealth within each level of TNAR, which suggests that pro-poor global and national efforts to increase accessibility of schools are having the desired impact and/or that absolute poverty is declining and the poorer households are better able to afford to send their children to school.

The **Education Policy and Data Center (EPDC)**, a partnership of FHI 360 and the US Agency for International Development, was founded in 2004 to contribute to better education policy making and planning through improved access to and use of data and analysis. For more information, see www.epdc.org.

[‡] This report has been prepared by the Education Policy and Data Center (EPDC) from a series of studies commissioned by the GMR as background to the *2009 EFA Global Monitoring Report*.

INTRODUCTION

The negative relationship between poverty and child school attendance has been well-established over the past decade. Almost all of the evidence for this link has come from household surveys. In their pioneering work, Filmer and Pritchett devised an indirect measure of wealth based on household goods that enables analysts to use household surveys to measure both wealth and school attendance. Over the years, Filmer and other authors have used this index to link household wealth with school attendance and school retention (Filmer and Pritchett 1999a; Filmer and Pritchett, 1999b; Filmer and Prichett, 2001; Filmer, 2005; Filmer, 2006; UNESCO, 2005; Ingram et al., 2006; UNESCO-OREALC, 2007; Smits et al., 2007).

The more recent papers also include correlation with other household characteristics, such as region of residence, parental education, gender, ethnic background, disability, orphan status; and a few have included multivariate analysis to sort out the independent effects of each variable. These all find significant, independent effects of household wealth. The studies that include retention find that wealth differentials in education tend to increase towards higher grade levels. Two analyses show that the wealth-enrolment correlation persists at the sub-national scale (Wils, et. al., 2005; EPDC, 2007a), but neither explores whether that correlation is an artifact of the aggregated household-wealth distribution or an independent regional effect.

Beyond attendance, it has become evident that learning levels, too, are correlated with household assets: for example, the second round of SACMEQ tests for 14 southern African countries shows that children of the lowest socio-economic status have lower scores than those of the highest status (SACMEQ II reports; UNESCO, 2004).

The existence of wealth-attendance differentials is of clear concern for equity reasons. Without overcoming the influence of wealth on school attendance, education for all cannot be attained. But, to our knowledge, analyses have not investigated one important issue: have wealth differentials changed over time?

Many school attendance programs have focused specifically on getting more disadvantaged children into school. The elimination of school fees in many countries in recent years was largely a movement to remove financial barriers for poorer children. In studies of school fee removal, Bentauett-Kattan and Burnett (2004) and Bentauett-Kattan (2006) found that, shortly after fee removal in 9 countries, school enrolment increased substantially (Bentauett-Kattan, 2006:8), and that the enrolment of poor children increased more quickly than that of wealthier children. Thus, fee removal, it would appear, reduces enrolment differentials by wealth.

Other programs have focused on providing poor children and their families with incentives to go to school, for example, providing food every month or school meals to poor children in schools in many countries, as well as direct stipends to poor families contingent on children's school attendance as with the Bolsa Escuela in Brazil.

Have these pro-poor programs as well as a general rise in school enrolment resulted in lower attendance differentials by wealth? This study looks at how successful developing countries around the world have been at removing wealth inequalities in education, and enabling poorer children to have as good an opportunity to attend school as their wealthier brethren. The study focuses on the trends from 1990-2006 in developing countries and covers as many countries using as many surveys as possible to obtain a complete picture.

DATA

Most countries in the world have conducted multiple household surveys over the past two decades or so, as documented in the International Household Survey Network's

online catalog2. Many, but not all of these surveys contain enough information on household assets so that wealth indices can be calculated, using the method developed by Filmer and Pritchett.

Between them, Filmer's EdAttain project at the World Bank, and the EPDC have accessed over 250 household surveys from over 100 countries. They have extracted from the surveys information on school attendance, and in many cases, attendance by wealth quintile. The data is available on the World Bank EdStats and EPDC websites. The most extensive coverage in terms of countries and surveys for school attendance by wealth is for the total primary net attendance rate, and therefore this is the indicator used in this study.

The attendance rate data for this study were obtained either from World Bank EdAttain page or directly from the survey datasets extracted by the EPDC. There are data available from two or more surveys for 61 countries, listed in Table 1. There are 15 countries with five or more post-1990 surveys; 6 with four surveys; 19 countries with three surveys; and 21 with only two surveys. The time interval ranges from two years (Panama and Burundi) to sixteen years (Thailand); a total of 206 surveys are included.

For 5 surveys, the EPDC extracted the TNAR with STATA3 and for a further 13 surveys, the TNAR rates by wealth quintile were taken from the MICS 2006 survey reports4. These surveys are noted with italics in the table. For the remaining 188 surveys, the TNAR is based on age-specific attendance rates from the World Bank EdAttain page5, single-year school age population from the United Nations population division6, and school system information from UIS.

For the calculation for TNAR the following formula is used:

$$TNAR = \frac{\sum_{a=startage}^{a=\max age} Att_a * Pop_a}{\sum_{a=startage}^{a=\max age} Pop_a}$$

where Atta is the age-specific attendance rate at age a; and Pop $_\alpha$ is the population at age a and the start age and max age refer to the official primary school entry age and the official age at the beginning of the last grade of primary school. The start age and duration of primary school are based on year-specific information and can include changes in the number of years of primary school or the official school entry age. The UN does not provide information on the age-distribution of children by wealth. It was not within the scope of this study to extract the age-distribution of children by wealth quintiles from all of the household surveys (many of which are not available to the EPDC) so it was decided to assume that the age-distribution of children is the same in each of the five wealth quintiles. This is likely to be a reasonably close approximation.

[2] The IHSN website is www.surveynetwork.org. The survey catalog is under the heading Activities. Accessed April, 2008.
[3] The extraction file is available from the EPDC upon request at epdc.org.
[4] The reports were found online at http://www.childinfo.org/mics/mics3/surveyreports.php, and accessed in February, 2008. Since that date it is likely that more reports have become available.
[5] http://www.worldbank.org/research/projects/edattain/edattain.htm accessed April, 2008. This page, maintained by Deon Filmer, contains household survey-based age-specific enrolment (depending on the indicators queried in the surveys) for surveys in developing countries from 1989-2006. This page is also easily reached via the World Bank EdStats homepage
[6] The single-year population estimates are interpolated from 5-year age groups and therefore do not necessarily reflect actual one-year age distributions of particular populations. The data was graciously provided to the EPDC by the United Nations Population Division and are an excerpt from the 2006 Population Prospects 2006 Revision (United Nations, 2007).

Table 1. List of countries and surveys for which at least two years of TNAR primary by wealth is available and which are included in this study.

Country	Surveys used		Country	Surveys used
Albania	MICS 2000,WBED 2002		Madagascar	DHS 1997, DHS 2003
Armenia	DHS 2000, DHS 2005		Malawi	DHS 1992, DHS 1996, DHS 2000, *DHS 2004*,WBED 2005, *MICS Report 2006*
Bangladesh	DHS 1993, DHS 1996, DHS 1999,WBED 2000, DHS 2004, *MICS Report 2006*		Mali	DHS 1995, DHS 2001
Benin	DHS 1996, DHS 2001,WBED 2003		Mexico	ENE 1994,WBED 2002
Bolivia	DHS 1993, DHS 1997, MICS 2000,WBED 2002, DHS 2003		Moldova	MICS 2000, DHS 2005
Brazil	DHS 1996,WBED 2001		Mongolia	MICS 2000, *MICS Report 2005*
Burkina Faso	DHS 1992,WBED 1994, DHS 1999, DHS 2003		Morocco	DHS 1992, DHS 2003
Burundi	EQ 1998, MICS 2000		Mozambique	INA 1996, DHS 1997, DHS 2003
Cambodia	SES 1997, DHS 2000, SES 2004, DHS 2005		Namibia	DHS 1992, DHS 2000
Cameroon	DHS 1991, DHS 1998, MICS 2000,WBED 2001, DHS 2004		Nepal	LSS 1996, DHS 2001, DHS 2006
CAR*	DHS 1994, MICS 2000, *MICS Report 2006*		Nicaragua	EMNV 1993, DHS 1998, DHS 2001
Chad	DHS 1998, MICS 2000, DHS 2004		Niger	DHS 1992, DHS 1997, MICS 2000, DHS 2006
Chile	ECSN 1990,WBED 1996,WBED 2003		Nigeria	DHS 1999, DHS 2003
Colombia	DHS 1990, DHS 1995, DHS 2000, DHS 2005		Panama	EH 1995, ENV 1997
Cote d'Ivoire	DHS 1994, DHS 1998, MICS 2000,WBED 2002, DHS 2005, *MICS Report 2006*		Paraguay	EH 1995,WBED 2001
Dominican Republic	DHS 1991, DHS 1996, DHS 1999, DHS 2000, MICS 2000, *MICS Report 2006*		Peru	DHS 1991,WBED 1994, DHS 1996, DHS 2000,WBED 2002, DHS 2004
Egypt, Arab Rep.	DHS 1992, DHS 1995, DHS 2000, DHS 2003, DHS 2005		Philippines	DHS 1993, DHS 1998, DHS 2003
Ethiopia	WMS 1995, DHS 2000, DHS 2005		Rwanda	DHS 1992,WBED 1997, MICS 2000, DHS 2005
Gambia, The	MICS 2000, *MICS Report 2006*		Senegal	DHS 1992, MICS 2000, DHS 2005
Ghana	LSS 1991, DHS 1993, DHS 1998, DHS 2003, *MICS Report 2006*		South Africa	LSDS 1993, OHS/IES 1995, DHS 1998, OHS 1999, GHS 2005
Guatemala	DHS 1995, DHS 1999,WBED 2002		Tajikistan	MICS 2000, *MICS Report 2005*
Guinea	EICV 1994, DHS 1999, DHS 2005		Tanzania	DHS 1991, DHS 1996, DHS 1999,WBED 2000, DHS 2004
Guyana	LSMS 1992, MICS 2000, *DHS 2005*		Thailand	SES 1990, SES 1994, SES 1998, SES 2002, *MICS Report 2006*
Haiti	DHS 1994, DHS 2001, *DHS 2005*		Togo	DHS 1998, MICS 2000, *MICS Report 2006*
Honduras	EPHPM 1995, *DHS 2005*		Turkey	DHS 1993, DHS 1998, *DHS 2003*
India	DHS 1992, DHS 1998, DHS 2005		Uganda	DHS 1995, DHS 2000, DHS 2006
Indonesia	DHS 1991, SES 1993, DHS 1994, SES 1995, DHS 1997, SES 1998, SES 2002		Uzbekistan	DHS 1996, *MICS Report 2006*
Kazakhstan	DHS 1995, DHS 1999		Vietnam	LSS 1992, DHS 1997, LSS 1998, MICS 2000,WBED 2001, DHS 2002
Kenya	DHS 1993, DHS 1998, MICS 2000, DHS 2003		Zambia	DHS 1992, DHS 1996,WBED 1998, MICS 1999, DHS 2001, LCMS 2003
Kyrgyz Republic	DHS 1997, *MICS Report 2006*		Zimbabwe	DHS 1994, DHS 1999, DHS 2005
Lesotho	MICS 2000, DHS 2004			

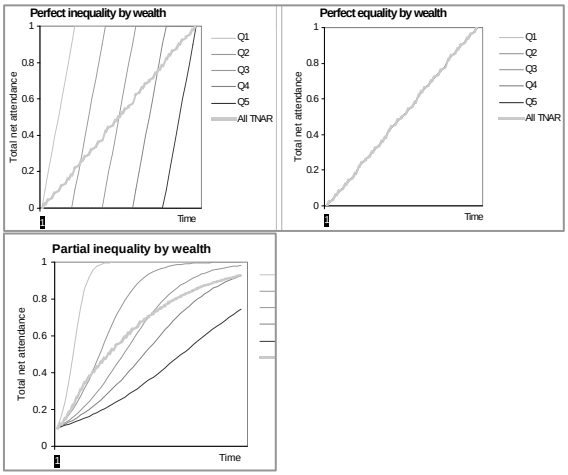
TNAR BY WEALTH QUINTILE OVER TIME

The raw results of trends of TNAR by wealth quintile over time are shown in Figure 1. These figures confirm earlier findings by Filmer and others discussed above, and show that wealth differences have existed (wherever measured) over the entire observation period 1990-2006.

1. There are consistently wealth differentials in all countries except where the attendance is complete (has reached 100%) for all wealth groups.
2. Consistently (with one or two exceptions), the poorer the quintile, the lower the attendance rates.
3. The *extent of the TNAR wealth differentials is not equal across all countries.* Some countries have larger TNAR wealth differentials than others[7].
4. In general, the *differential attendance rates of the five wealth quintile groups are spread evenly*. For example, in Benin, on the first page of Figure 1, there is an even spread between the five lines. In contrast, in Burkina Faso (also on the first page of Figure 1), the wealthiest group (Q5) stands out with much higher attendance rates than in the other four wealth groups. The same is true in Ethiopia and Niger. In Turkey and Vietnam the poorest quintile stands out with markedly lower attendance rates than the wealthier four quintiles.

The *trend lines for some countries fluctuate*, with wealth differentials changing much from one survey to the next, indicating that there is a margin of uncertainty around all of the values determined by factors such as survey questionnaire design and sampling. One example of such a pattern is seen in Burkina Faso, where the wealth differentials in the 1994 *Etude sur les vis de menages* survey are very different from the 1992 and 1999 DHS surveys – in the 1994 survey, the attendance rates of the poorer groups are higher and TNAR of the wealthiest group is lower and, overall, the wealth differential is much smaller than in the two DHS surveys. The same type of pattern, with a narrower wealth differential (for TNAR) for a non-DHS survey appears in Benin 2003 (CWIC); Cameroon 2001 (*Enquete Camerounaise aupres des menages*); Cote d'Ivoire 2002 (*Enquete niveau de vie des menages)*; Indonesia 1993 and 1995 *Socio-economic surveys*; Malawi 2005 (*Welfare monitoring survey)*; Mozambique 1996 (*National household survey)*; Peru 1994 (*Enquesta nacional de hogares sobre Medicion de Niveles de Vida*). The very low differentials by wealth in these surveys suggest that they are not as well-designed for disaggregating households by wealth as the DHS surveys are.

Another set of fluctuations comes from the MICS 2000 surveys, of which some have relatively low TNAR values compared to surveys shortly before or after 2000 (Burundi, Central African Republic, Dominican Republic, Kenya, Senegal, and Vietnam).



[7] Theoretically, attendance differentials by wealth must lie somewhere between two extremes: perfect exclusion and no wealth exclusion effect. If there is perfect exclusion of children by wealth quintile, then, first, all the children of Q1 (the wealthiest 20%) enter school, then the children in Q2, etcetera, and finally, the poorest 20% of children in Q5. The graph for TNAR by wealth quintile over time would look like the one on the left below, "Perfect inequality by wealth". At the other extreme, there could be *no* wealth exclusion, TNAR increases over time, at each period the attendance of all the wealth groups is equal, and the graph for TNAR by wealth quintile would look like the middle graph below, "Perfect equality by wealth". Reality lies between the two extremes. The TNAR by wealth quintile trends look like segments from the figure on the right, "Partial inequality by wealth" below. Each country lies somewhere between the two extremes, but at different points.

Figure 1. Total primary attendance rate over time by wealth quintile in 61 developing and transitional countries. Quintile 1 corresponds to the poorest 20% of households, and Quintile 5 corresponds to the wealthiest 20%.

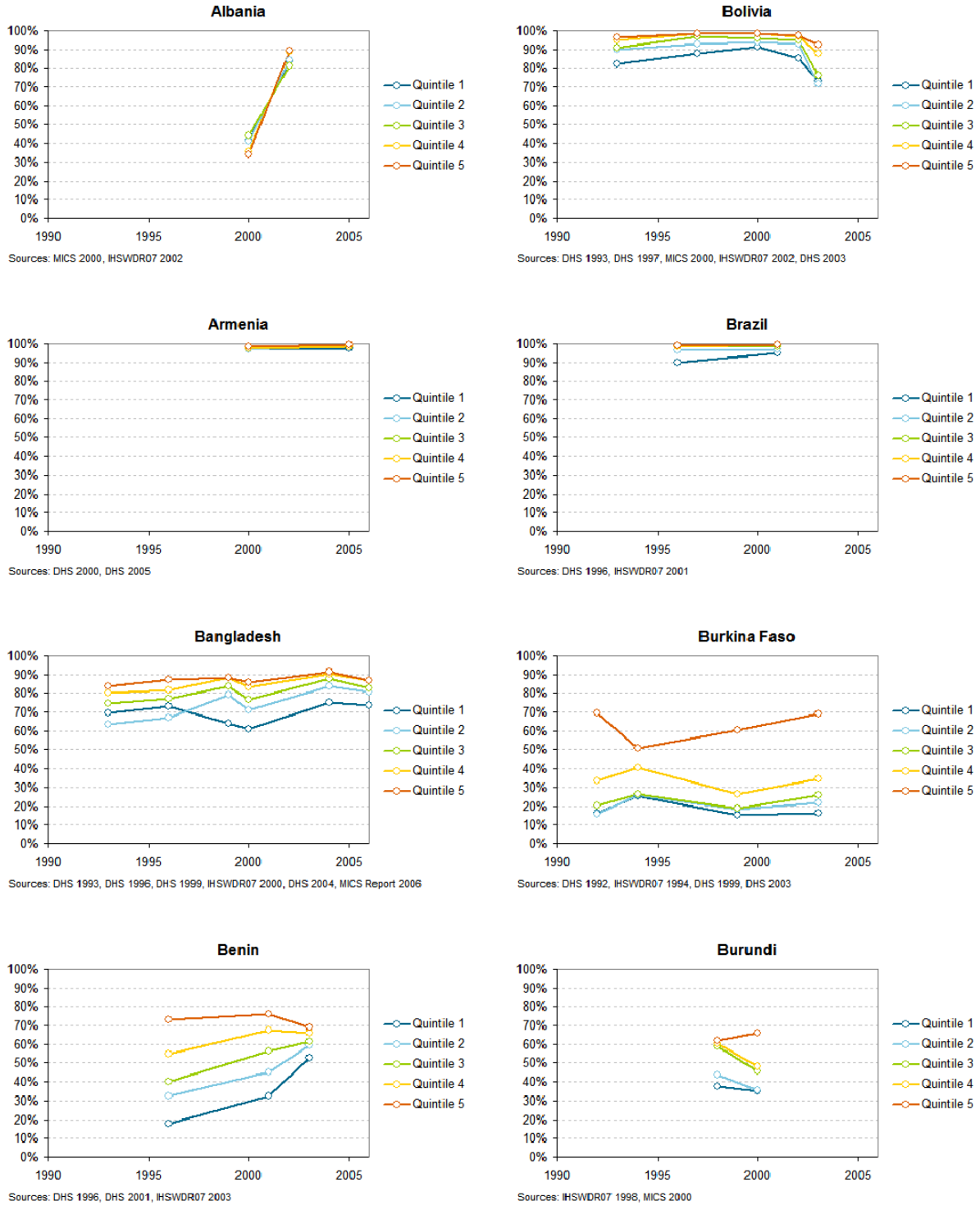
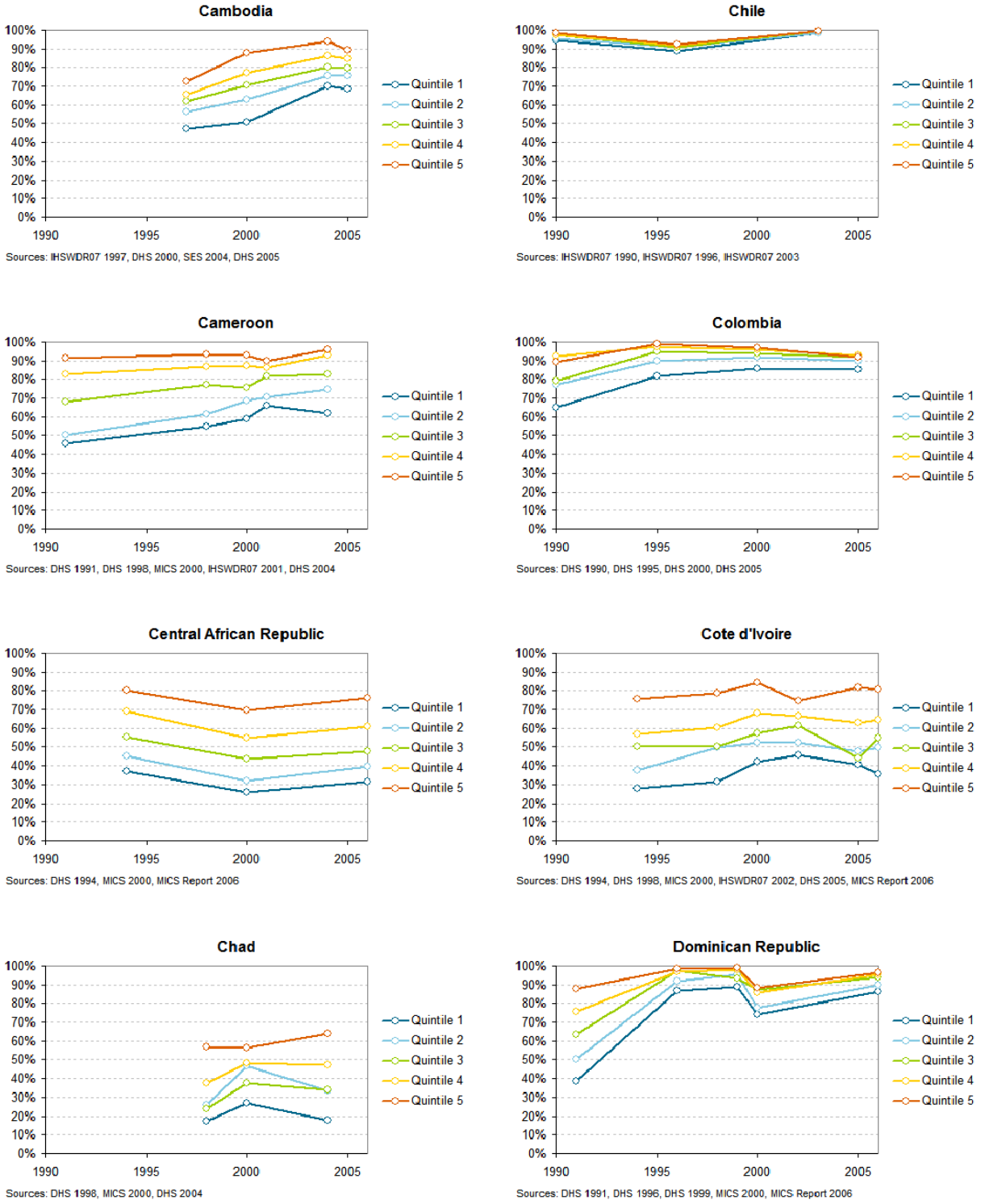


Figure 1 continued.



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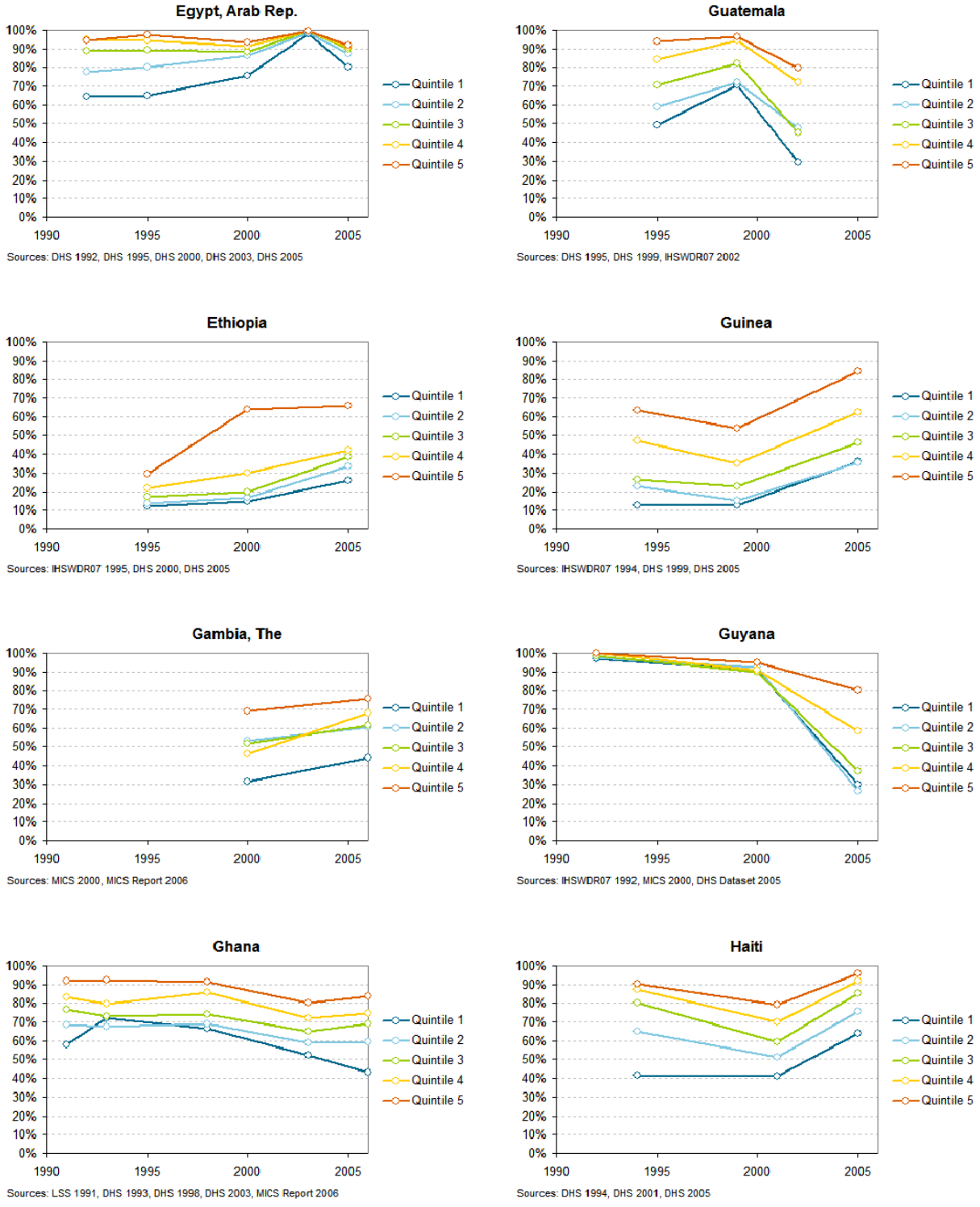

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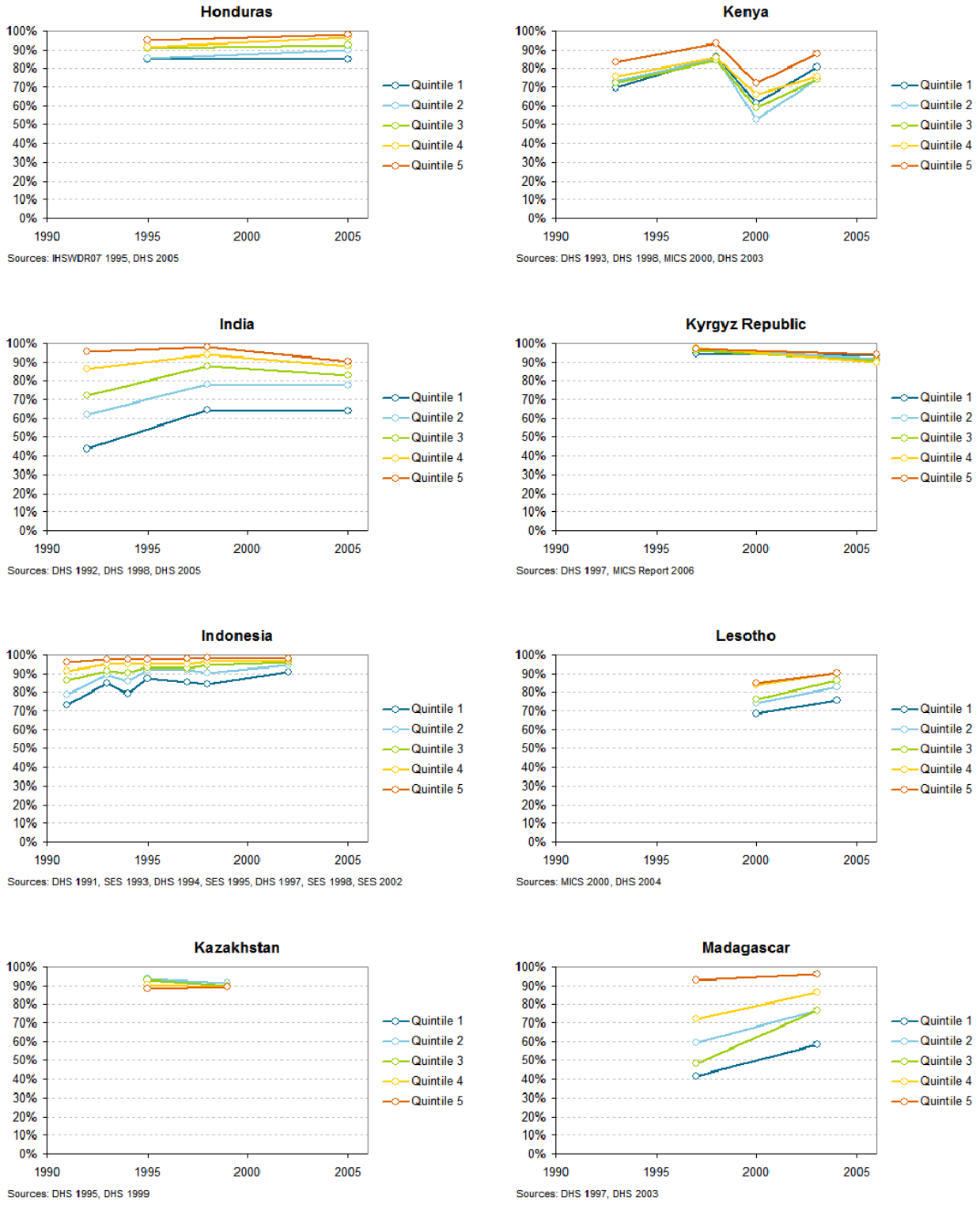

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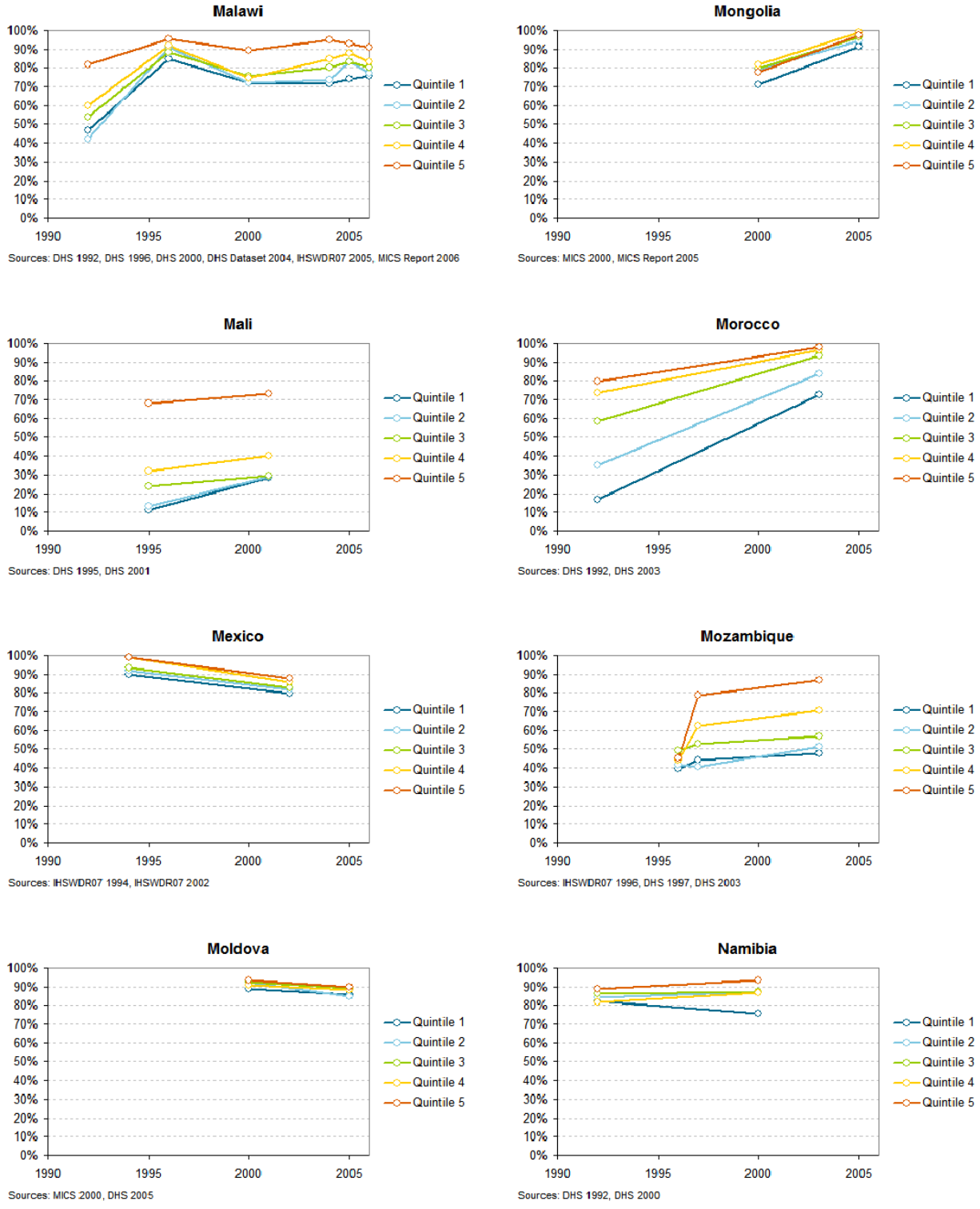

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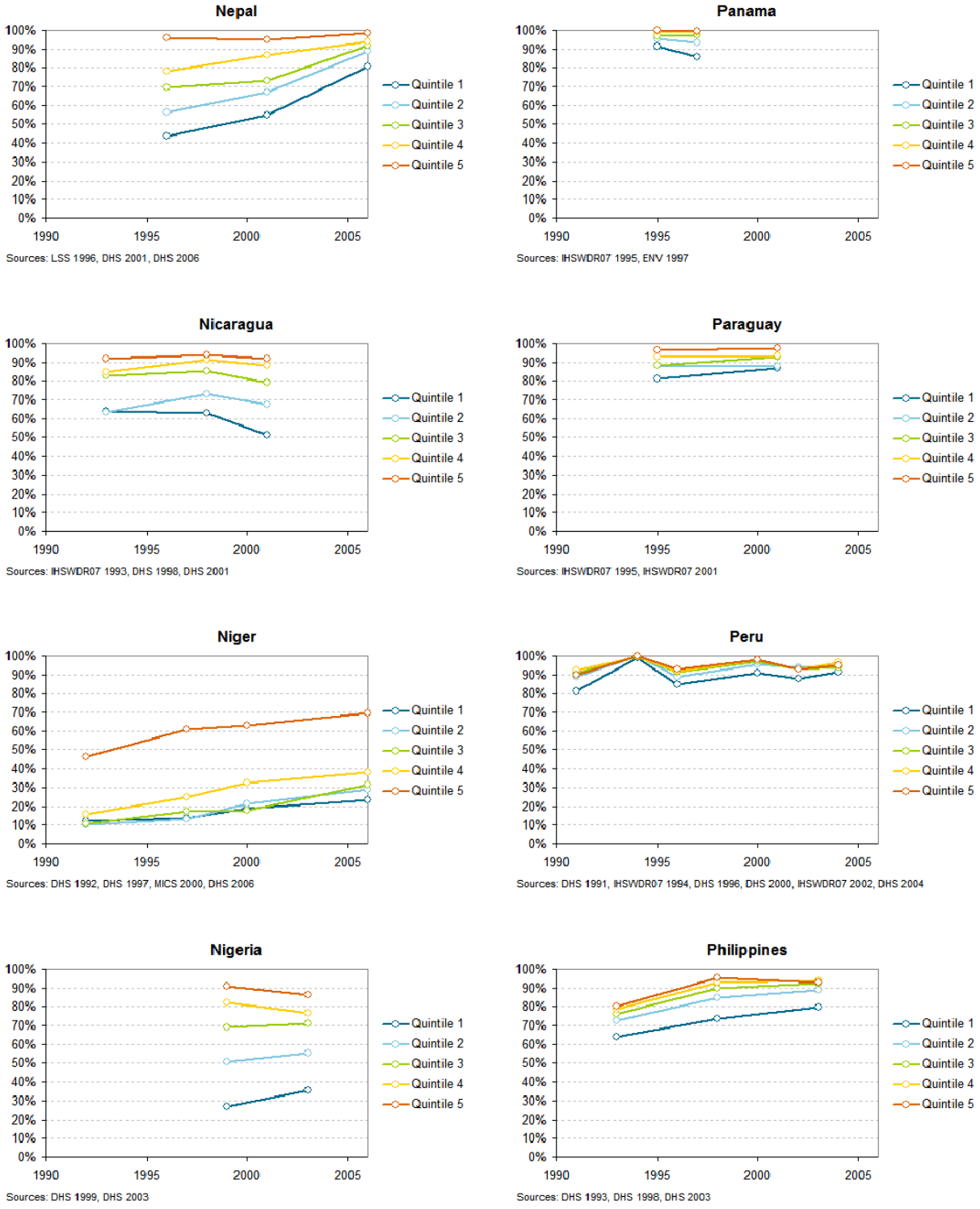

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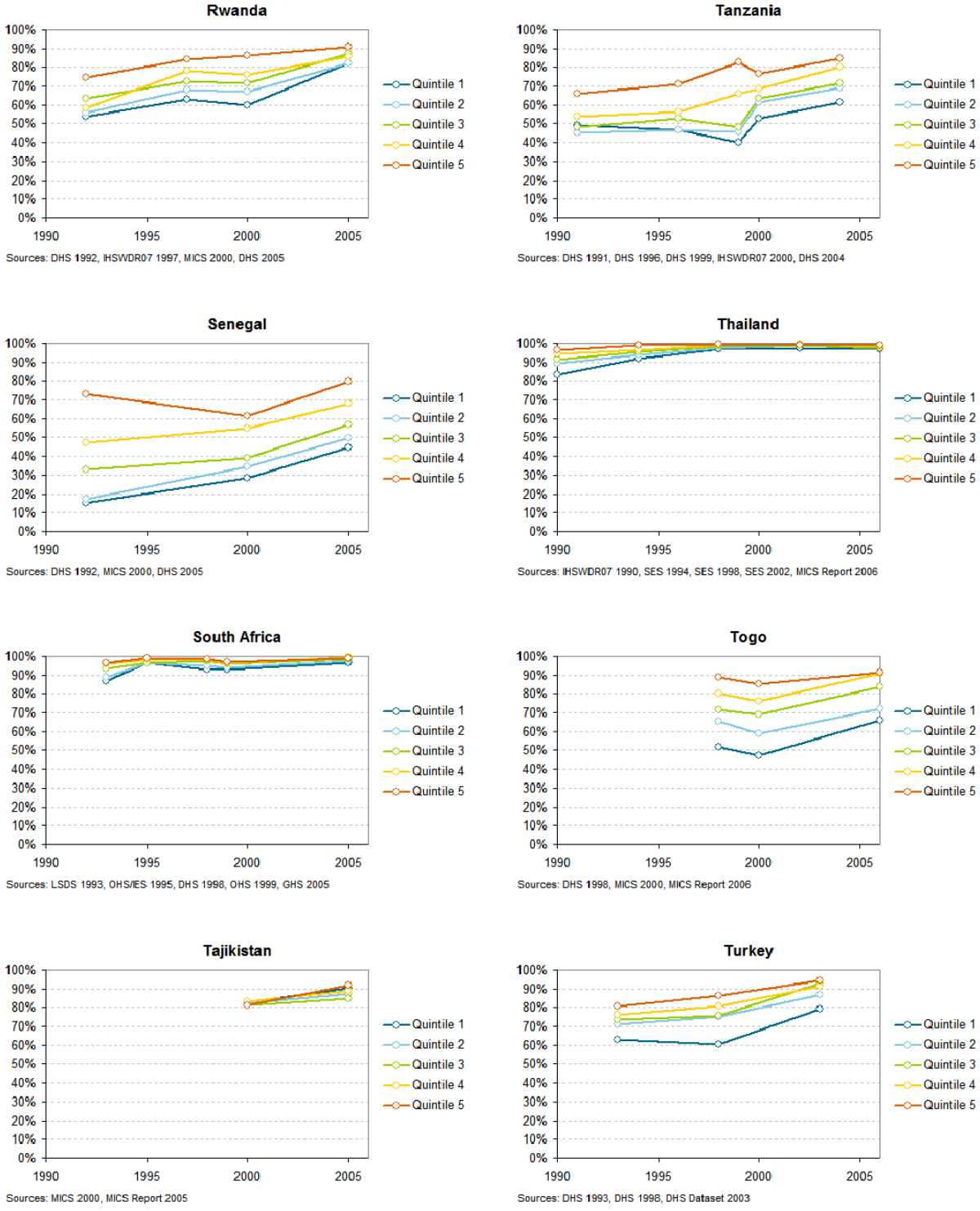

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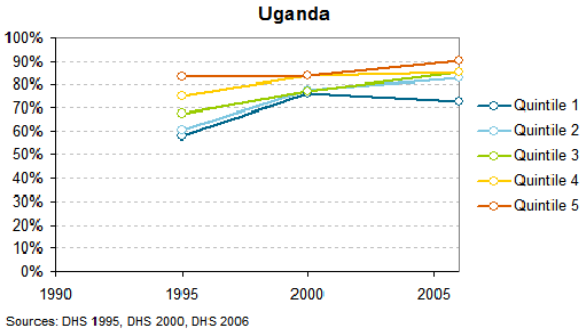
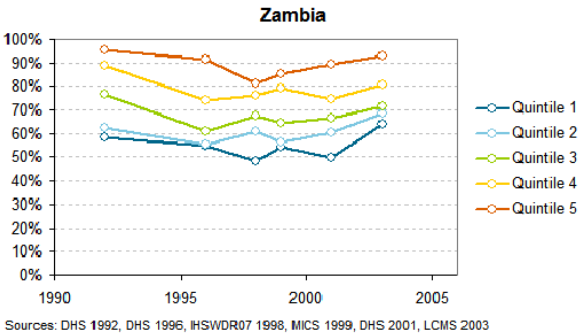
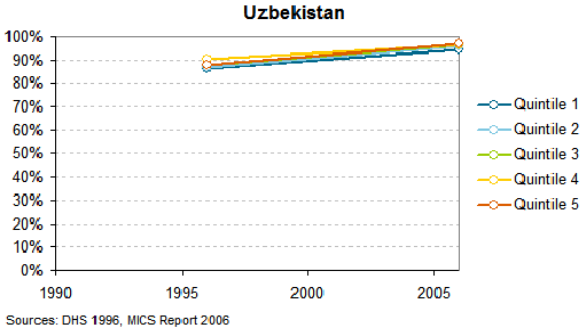


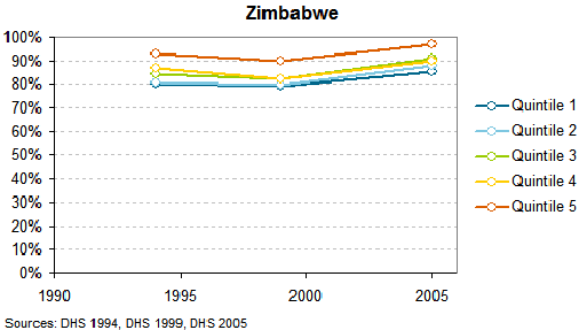
Sources: DHS 1995, DHS 2000, DHS 2006



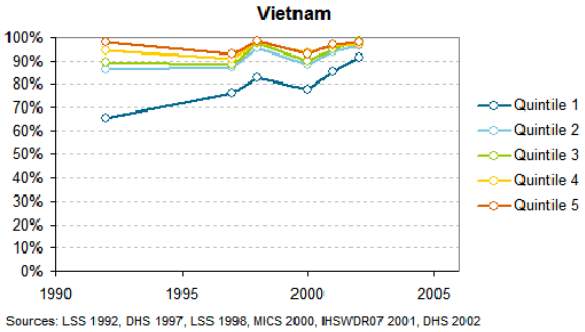
Sources: DHS 1992, DHS 1996, IHSWDR07 1998, MICS 1999, DHS 2001, LCMS 2003



Sources: DHS 1996, MICS Report 2006



Sources: DHS 1994, DHS 1999, DHS 2005



Sources: LSS 1992, DHS 1997, LSS 1998, MICS 2000, IHSWDR07 2001, DHS 2002

MEASURE OF INEQUALITY – THE GINI COEFFICIENT – OVER TIME

A well-known measure of the extent of inequality is the Gini coefficient[8]. The Gini coefficient was developed to quantify income inequality, but it has since been used in various sectors, including health (O'Donnel et al., 2008). In this study, the Gini coefficient is used to quantify the inequality of school attendance distribution across five income groups. A larger Gini coefficient implies greater inequality. In general, the Gini coefficient is a positive number, meaning the lower incomes have lower school attendance rates; in a few exceptional countries, the Gini coefficient is negative – children from poor households have slightly higher attendance rates than children from wealthy households. Annex 1 describes the calculation of the Gini coefficient for attendance by income groups.

Table 2 shows the Gini coefficients for the 206 household surveys. In general, there appears to be a declining trend, not always linear. For example, in Benin, the Gini coefficients were .24 in 1996, .16 in 2001, and .05 in 2003, a clear declining trend; but in Burkina Faso, the Gini coefficients are 0.32 in 1992; .16 in 1994, and 0.28 in 1999 and 2003, a non-linear and only marginally declining trend.

A clearer presentation of the trends is provided by the two charts in Figure 2. The figure shows the range of observed Gini coefficients for each country (vertical lines) and highlights the earliest and the most recent measures. Countries are arranged in declining order of the earliest Gini coefficient value – starting with countries with the greatest school attendance differentials by wealth in the earliest year. There are two charts: the top one includes all surveys, not all of which may be entirely comparable, as evidenced by the fluctuations in Figure 1; the bottom one includes DHS surveys only, all of which should be reasonably, if not exactly, comparable[9].

Both graphs clearly show the predominance of *declining wealth differentials in school attendance.* In most countries, the decline of wealth differentials is substantial, in particular in Mali, Senegal, Niger, Guinea, Morocco, Benin, Dominican Republic, Nepal, and Malawi (listed in the order in which they appear on the graph). In a few countries, Burkina Faso, Chad, and Ethiopia, for example, wealth differentials have more or less remained stagnant.

The graphs also show that mixing different surveys together increases the range of the Gini coefficient – to a certain extent, the wealth differentials of attendance are affected by the survey design. For example, the range of the Gini coefficients in Burkina Faso, the second country in both graphs, is large if all surveys are included, but small if only the DHS surveys are included. The outlying value comes from the 1994 *Etude sur les vies de menages* survey. It is 0.16 compared to 0.28-0.32 for the three DHS surveys. Regardless of whether the non-DHS surveys are included or not, the general pattern remains: declining inequality by wealth in attendance over time.

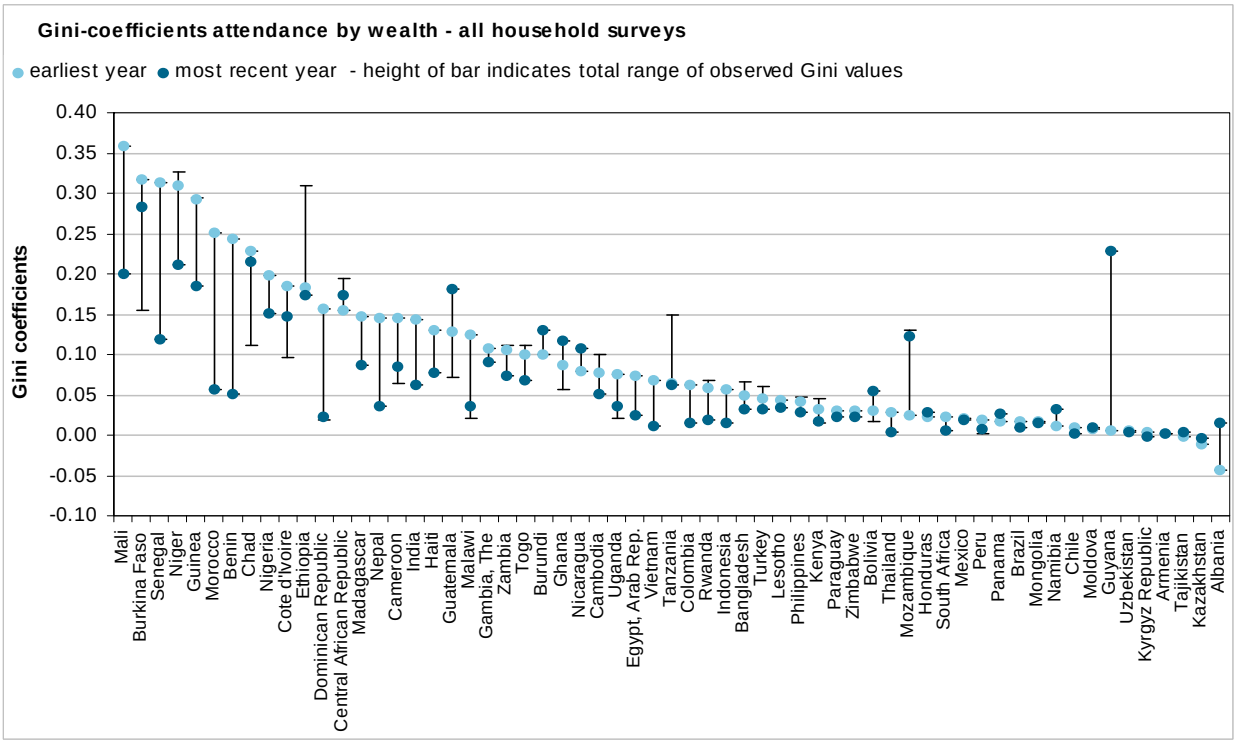
[8] The Gini coefficient was developed by the Italian statistician Corrado Gini and published in his 1912 paper "Variability and Mutability" (Italian: *Variabilità e mutabilità*)

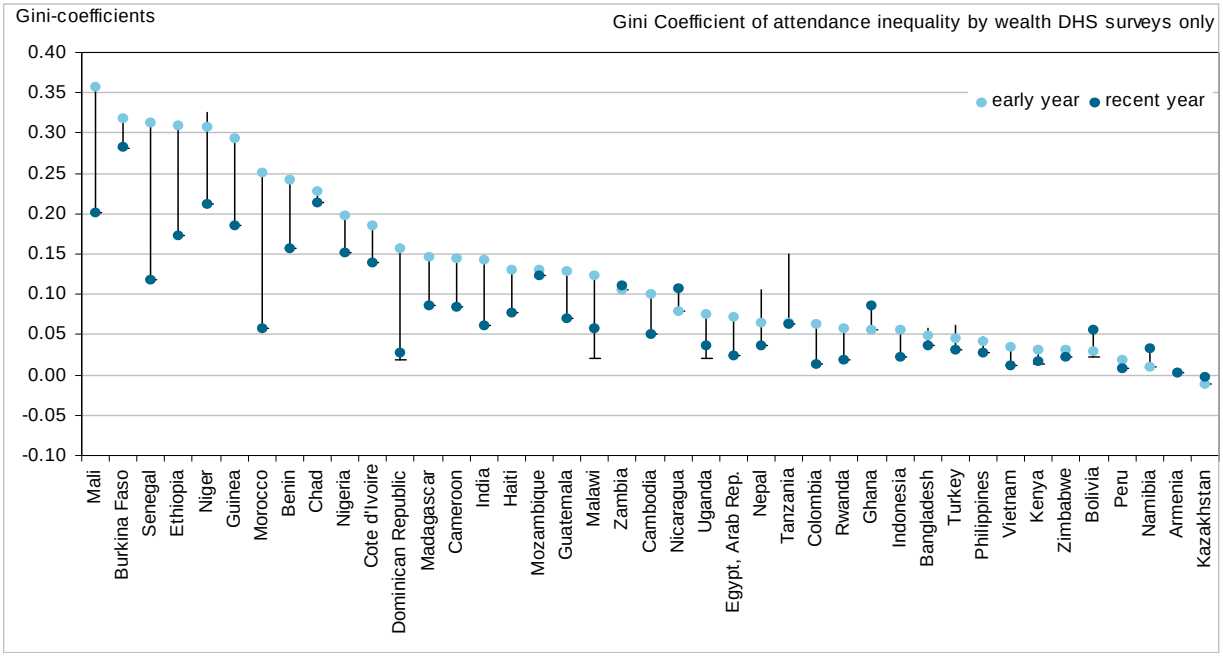
[9] The DHS surveys have been modified a number of times, therefore, from one period to the next, the questionnaires and/or the sampling method are not exactly the same. However, these surveys display consistent trends, suggesting that the indicators are reasonably comparable over time.

Table 2. Gini coefficients of school attendance differentials by wealth for 206 household surveys.

Gini Index	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Albania											-0.04		0.02				
Armenia											0					0	
Bangladesh				0.04			0.04			0.06	0.06				0.04		
Benin							0.24					0.16		0.06			
Bolivia				0.02				0.02			0.02		0.02	0.06			
Brazil							0.02					0.02					
Burkina Faso			0.32		0.16					0.28				0.28			
Burundi									0.1		0.14						
Cambodia								0.08			0.1				0.06	0.06	
Cameroon		0.14							0.12		0.1	0.06			0.08		
CAR*					0.16						0.2						
Chad									0.22		0.12				0.22		
Chile	0						0							0			
Colombia	0.06					0.04					0.02					0.02	
Cote d'Ivoire					0.18				0.16		0.14		0.1			0.14	
DR*		0.16					0.02			0.02	0.04						
Egypt			0.08			0.08					0.04			0		0.02	
Ethiopia						0.18					0.3					0.18	
Gambia											0.1						0.1
Ghana		0.08		0.06					0.06					0.08			
Guatemala						0.12				0.08			0.18				
Guinea					0.3					0.3						0.18	
Guyana			0								0						
Haiti					0.14							0.12				0.16	
Honduras						0.02										0.04	
India			0.14						0.08							0.06	
Indonesia		0.06		0.02	0.04	0.02		0.02	0.02				0.02				
Kazakhstan						-0.02				0							
Kenya				0.04					0.02		0.04			0.02			
Kyrgyz Rep.								0									0
Lesotho											0.04				0.04		
Madagascar								0.14						0.08			
Malawi			0.12				0.02				0.04					0.04	
Mali						0.36						0.2					
Mexico					0.02								0.02				
Moldova											0					0.02	
Morocco			0.26											0.06			
Mozambique							0.02	0.14						0.12			
Namibia			0.02								0.04						
Nepal							0.14					0.1					0.04
Nicaragua				0.08					0.08			0.1					
Niger			0.3					0.32			0.26						0.22
Nigeria										0.2				0.16			
Panama						0.02		0.02									
Paraguay						0.04						0.02					
Peru		0.02			0		0.02				0.02		0		0		
Philippines				0.04					0.04					0.02			
Rwanda			0.06					0.06			0.06					0.02	
Senegal			0.32								0.16					0.12	
South Africa				0.02		0			0.02	0						0	
Tanzania		0.06					0.08			0.14	0.06				0.06		
Thailand	0.02				0.02				0				0				
Togo									0.1		0.12						
Turkey				0.04					0.06								
Uganda						0.08					0.02						0.04
Uzbekistan							0										0
Vietnam			0.06					0.04	0.02		0.04	0.02	0.02				
Zambia			0.1				0.1		0.1	0.1		0.12		0.08			
Zimbabwe					0.04					0.02						0.02	

Figure 2. Gini coefficients (measurements of extent of inequality) of attendance differentials by wealth in the earliest and the most recent year of measurement. The top chart provides the total range of Gini values (bars) for all household surveys available. The bottom chart presents Gini values only for DHS surveys.





CORRELATION OF ATTENDANCE INEQUALITY BY WEALTH AND OVERALL ATTENDANCE RATES

During the period that the Gini coefficients declined, attendance rates increased. We would therefore expect at least some positive correlation between them, but how strong remains to be seen. The closer the correlation, the more wealth correlates with attendance rates, and, by extension, one can posit, the stronger the exclusionary effect of poverty on school attendance[10].

A cross-tabulation of total net attendance rates (x-axis) and the Gini coefficient of attendance differentials by wealth quintiles (y-axis) is shown in the two panels of Figure 3 with a top panel showing all surveys and the bottom DHS surveys only. The data is divided into four periods, 1990-4 (shown in red), 1995-9 (orange), and 2000-4 (green) and 2005-6 (blue).

First, it is clear that there is a strong negative correlation between the TNAR and the Gini coefficients – the dots form a clear linear collection. Universally, *when overall schooling is low, the poorer are relatively more excluded*.

Within any given level of TNAR, the Gini-coefficient ranges only by a factor of 2-3. For example, in the TNAR range of 50-55, the Gini values range from a minimum of .03 to .09; in the TNAR range of 40-45, the Gini values range from a minimum of .09 to .15. *The extent of the exclusion of poorer children appears to be not only universal but relatively similar across countries for each given level of TNAR*.

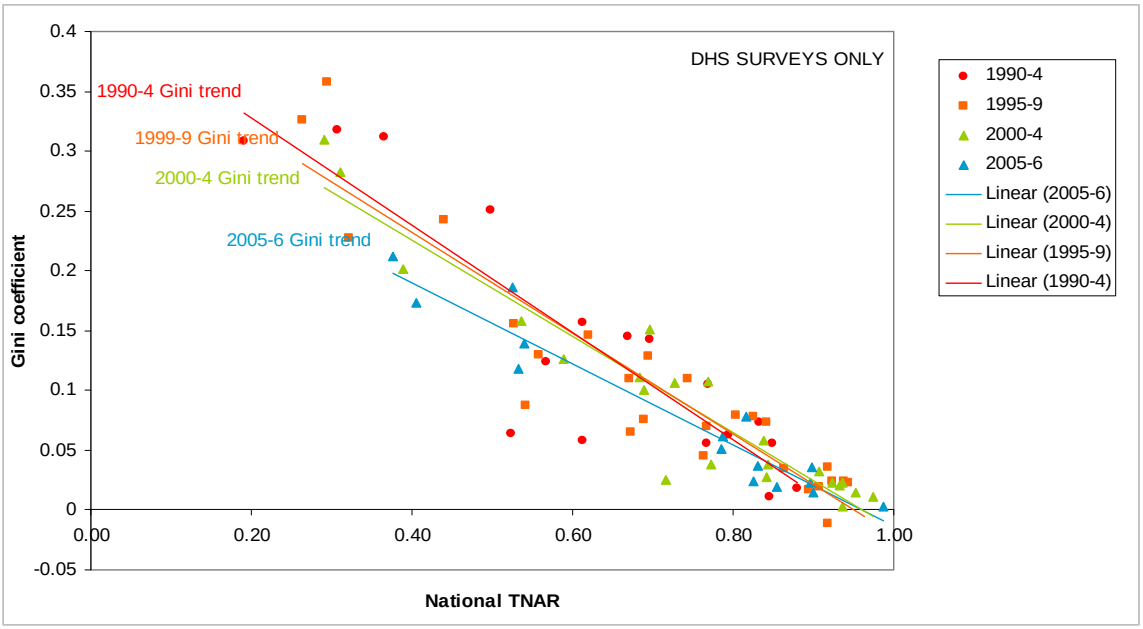
In more recent years the correlation of wealth and school attendance has been weakened within each TNAR range.

The range of Gini values within each TNAR level suggests that there are factors that make poverty a stronger exclusion factor in some countries than in others. One can also imagine that such factors might have changed over time – as the result of pro-poor education policies. A check on this hypothesis is whether the coefficients of the correlations between the TNAR overall and the Gini coefficients have changed over time. Table 3 shows the intercepts and slope coefficients of the correlations of TNAR and the Gini coefficients in four periods for all surveys and the DHS surveys only. The table shows that the intercepts have been declining over time both for all surveys and only DHS surveys, and are lowest in the 2005-6 period, with small standard error values despite the relatively small sample sizes. The slopes are flatter for each period, as the Gini coefficient tends towards zero at NAR=100% but initiating from consecutively lower starting points (the intercepts). Figure 3 shows the trend-lines through the data points of each of the four periods. Corresponding to the statistics, the correlation trend-lines for the more recent periods lies below the earlier ones.

These results suggest that pro-poor programs such as those that have been implemented over the past 10 years – fee removal, stipends, feeding programs, schools specifically for poor children and so forth – have been successful, overall, at reducing the exclusion of poor children from schools, over and beyond the effects of generally rising TNAR.

[10] Keeping in mind that a correlation by itself is not a proof of causation.

Figure 3. Cross tabulation of Gini coefficients and overall TNAR for all surveys from 61 countries (top panel) and DHS surveys only in 41 countries (bottom panel) divided into four periods - 1990-4, 1995-9, 2000-4, and 2005-6 – including the correlation trend line for reach period.



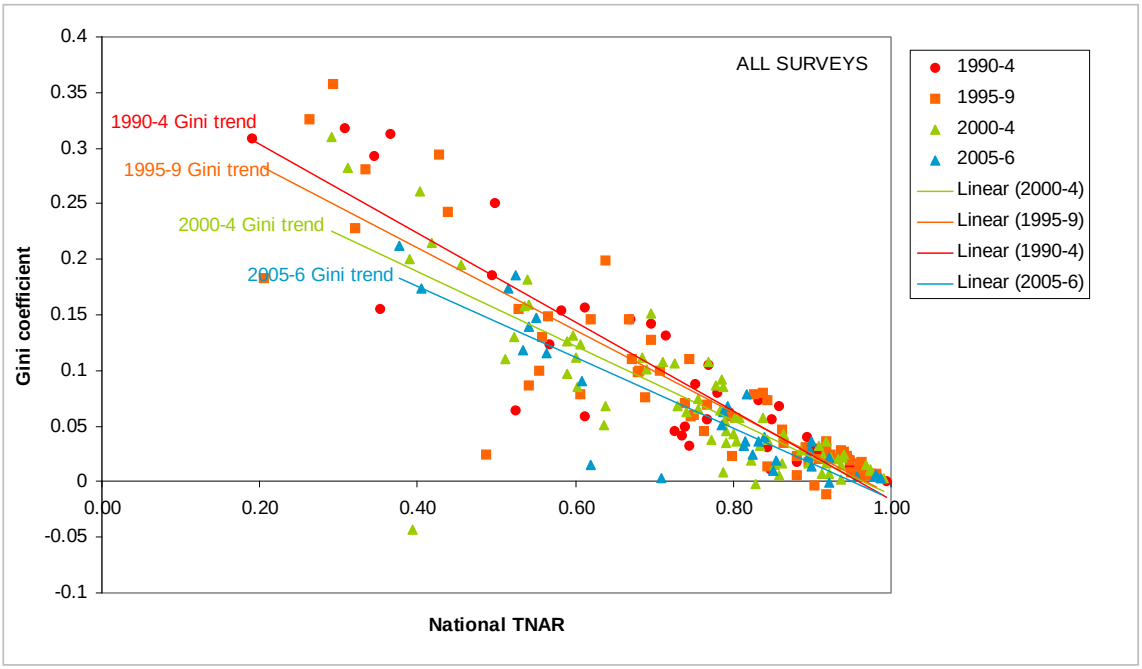
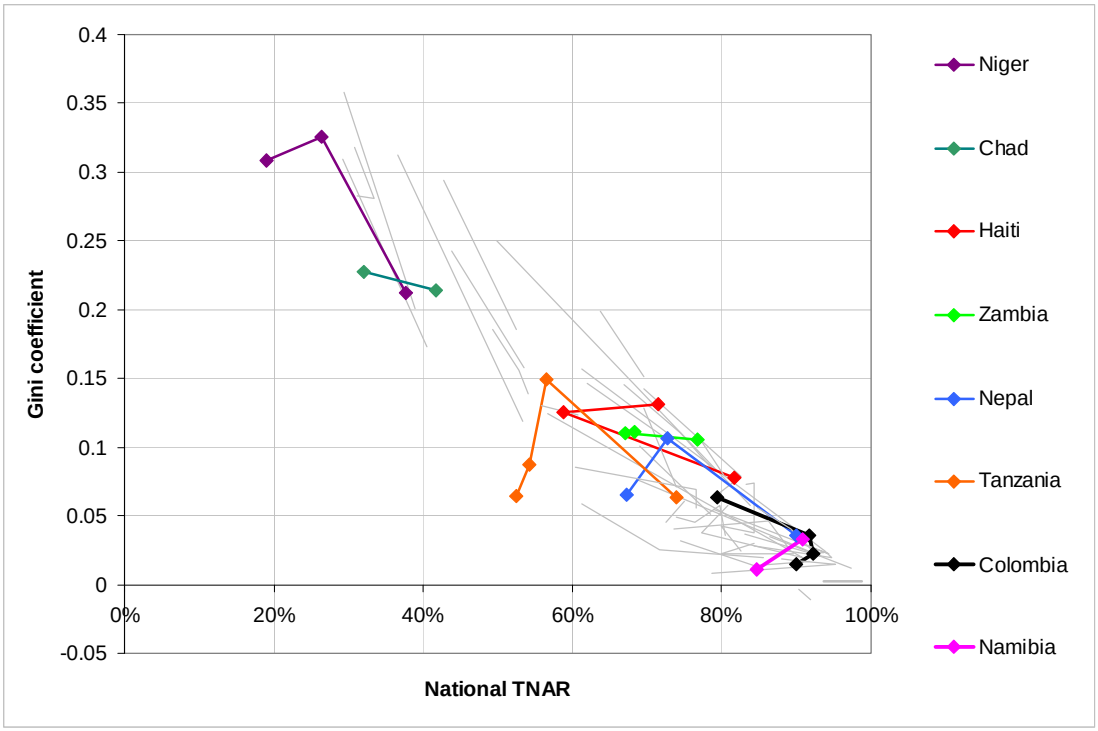


Table 3. Intercept (*i*) and coefficient *(c)* with standard errors for the correlation of TNAR and the Gini coefficients in four periods. Statistics based on standard Excel regression function.

Period	All surveys		DHS only	
1990-4	*N=40*	i=.38 (s.e.=0.02); c=-.40 (s.e.=0.03)	N=26	i=.41 (s.e.=0.03); c=-.45 (s.e.=0.05)
1995-9	*N=61*	i=.36 (s.e.=0.02); c=-.37 (s.e.=0.03)	N=38	i=.42 (s.e.=0.02); c=-.45 (s.e.=0.03)
2000-4	*N=71*	i=.32 (s.e.=0.02); c=-.34 (s.e.=0.03)	N=35	i=.37 (s.e.=0.02); c=-.40 (s.e.=0.03)
2005-6	*N=32*	i=.30 (s.e.=0.02); c=-.32 (s.e.=0.03)	N=15	i=.33 (s.e.=0.02); c=-.34(s.e.=0.03)

Figure 4. Cross-tabulation of TNAR and the Gini coefficients with the data for each country connected into a line. Highlighted in the figure are 9 countries with atypical trends of TNAR and Gini-coefficient correlation.



EXCEPTIONAL COUNTRIES - WHERE ATTENDANCE INEQUALITY BY WEALTH IS CHANGING MORE RAPIDLY OR MORE SLOWLY THAN EXPECTED

The cross-tabulations of Figure 3 show that, overall, there is a negative correlation between TNAR and the Gini coefficient for attendance differentials by wealth. But the figure does not show the *country-specific* patterns of correlation. In Figure 4, the country specific dots of Figure 3 are connected – only the DHS surveys are included to eliminate survey structure factors. The slopes of the collection of lines in this graph show the path of TNAR and the Gini coefficients over time for each country. As it turns out, for most countries, the slopes are relatively similar. But there are a few countries where the correlations of TNAR and wealth inequality of attendance are markedly different. These are highlighted in the figure.

- In Chad and Zambia the Gini coefficient remains relatively constant despite TNAR increases.
- Niger, Tanzania and Nepal had a period of increasing TNAR and growing inequalities (rising Gini coefficients) in the 1990s and a switch to declining Gini coefficients sometime in the late 1990s or early 2000s. Of these, Tanzania removed school fees in 2001, and one surmises that the turn-around of the Gini trend is related to this policy change.
- Namibia experienced rising TNAR and a rising Gini coefficient between 1992 and 2000. The most recent survey is relatively old; it is possible that Namibia would have fit with the above three countries with more recent data (a 2006 DHS survey has been conducted but the data is not yet available).
- Columbia has a declining Gini coefficient for a portion of the observation period, with fixed TNAR levels around 90%.
- Haiti experienced a decline in TNAR with constant Gini coefficients – all wealth groups were similarly affected by the decline in attendance – and subsequently a return to the common pattern of rising TNAR and falling Gini coefficients.

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ABBREVIATIONS

DHS	Demographic and Health Surveys
ECSN	Encuesta de Caracterizacion Socioeconomica Nacional
EFA	Education for All
EH	Encuesta de Hogares
EICV	Enquete Integrale sur les Conditions de Vie des Menages
EMNV	Encuesta Nacional de Hogares sobre Medicion de Nivel de Vida
ENE	Encuesta Nacional de Empleo
ENV	Encuesta de Niveles de Vida
EPDC	Education Policy and Data Center
EPHPM	Encuesta Permanente de Hogares de Propositos Multiples
EQ	Enquete Prioritaire
GMR	Global Monitoring Report
IHSN	International Household Survey Network
INA	Inquerito Nacional aos Agregados
LCMS	Living Conditions Monitoring Survey
LLECE	Latin American Laboratory for the Assessment of Educational Quality
LSDS	Living Standards Development Survey
LSMS	Living Standards Measurement Survey
LSS	Living Standard Survey
MICS	Multiple Indicator Cluster Survey
OHS/IES	October Household Survey/Income and Expenditure Survey
SES	Socio Economic Survey
TNAR	Total Net Attendance Rate
UIS	UNESCO Institute of Statistics
UNESCO	United Nations Education, Science, and Culture Organization
USAID	United States Agency for International Development
WBED	World Bank EdAttain Project
WMS	Welfare Monitoring Survey

DEFINITIONS

Gini coefficient. A well-known measure of the extent of inequality, developed by an Italian statistician Corrado Gini to quantify income inequality. In this study, the Gini coefficient is used to quantify the inequality of school attendance distribution across five income groups.

Total primary net attendance rate (TNAR). All children of primary school age who said they were attending either primary or secondary school (but not pre-primary) divided by the number of children of primary age.

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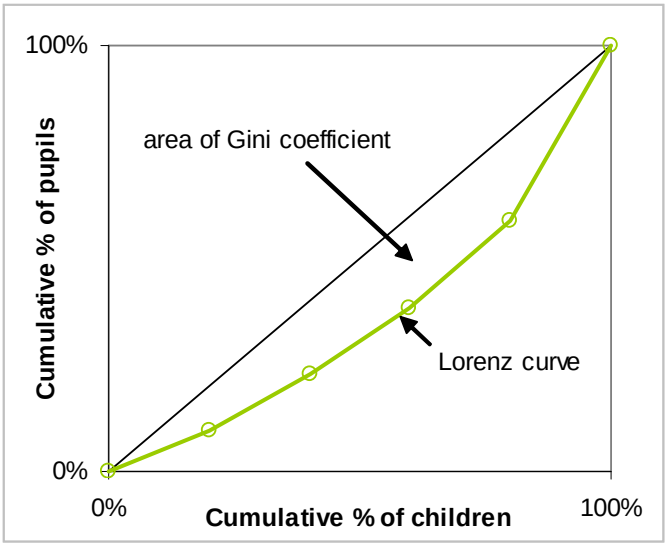
This report has been prepared by the Education Policy and Data Center (EPDC) staff, Annababette Wils and Sarah Oliver, and reviewed by George Ingram. The first draft of this paper was prepared as one of a series of reports the EPDC provided as background for the 2009 EFA Global Monitoring Report. The EPDC team is grateful to the GMR team for excellent guidance and commentary and for the collegial spirit in which this work was conducted. However, the views presented in this report are those of the EPDC only and do not necessarily reflect those of the Global Monitoring Report or any other organization.

ANNEX 1. CALCULATION OF GINI COEFFICIENT FOR SCHOOL ATTENDANCE BY WEALTH GROUPS.

To measure the trends in school attendance differentials by wealth of household, the Gini coefficients were calculated for all of the 206 surveys. Figure 5 shows an example of the attendance distribution by wealth in Burkina Faso. The curved line (known as the Lorenz curve) shows the cumulative attendance up to and including each consecutive quintile. The diagonal line shows complete equality. The Gini coefficient is twice the area between the Lorenz and the diagonal curve.

This representation assumes the number of children is evenly distributed across incomes - if there are more children in poorer groups, the Gini coefficient is underestimated; vice-versa if there are more children in wealthier groups. For the majority of surveys utilized (those from the World Bank EdAttain site) the distribution is not provided and an assumed distribution was made because extracting from datasets would require resources beyond the scope of this study. However, the assumption is likely to be reasonable and the bias in the Gini coefficients will be small.

Figure 5. Example of attendance distribution by wealth from Burkina Faso 2003.



The Gini coefficient is calculated using the equations in Table 4.

Table 4. General equations used to calculate the Gini coefficient of attendance distribution by wealth of household with *n* wealth groups.

Wealth group	Attendance rate, a_w	Percent of pupils, p_w	Cumulative pupils, c_w	Area under Lorenz curve, L_w
W_1	a_1	$p_1 = \frac{a_1}{\sum_{w=1}^{n} a_w}$	$c_1 = p_1$	$L_1 = \frac{p_1}{2n}$
W_2	a_2	$p_2 = \frac{a_2}{\sum_{w=1}^{n} a_w}$	$c_2 = \sum_{w=1}^{2} p_w$	$L_2 = \frac{p_2}{2n} + \frac{c_1}{n}$
⋮	⋮	⋮	⋮	⋮
W_n	a_n	$p_n = \frac{a_n}{\sum_{w=1}^{n} a_w}$	$c_n = \sum_{w=1}^{n} p_w$	$L_n = \frac{p_n}{2n} + \frac{c_{n-1}}{n}$
Total				$\sum_{w=1}^{n} L_w$
Gini coefficient				$1 - 2\sum_{w=1}^{n} L_w$