

# **Disparity in fertility transition and education, and implications for demographic dividend: analysis of Demographic and Health Surveys from 31 sub-Saharan African countries**

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## **Background**

Demographic dividend is accelerated economic growth associated with changes in population age structure, specifically having more working age population relative to young and old dependent population. Bloom and Canning pioneered the research area, showing that economic growth is associated with the relative proportion of working population but not necessarily with the mortality or fertility level themselves (Bloom et al. 2000, Bloom et al. 2003). Fertility decline is a necessary but not sufficient condition to realize demographic dividend (Reher 2011, Gribble and Brember 2012), and a recent study highlighted critical contribution of education (Crespo Cuaresma et al. 2014). In sub-Saharan Africa, it has been shown that the pace of estimated and projected fertility decline is relatively slow in a majority of countries – with an exception of countries mostly in Southern Africa, suggesting changes in age structure are unlikely to be substantial and rapid enough to realize demographic dividend, compared to experience in select countries in other regions (Choi 2015).

Nevertheless, within-country variation in many socioeconomic and demographic characteristics has been widely documented. While pace of fertility decline is generally slow at the national level in many countries in the region, there is substantial within-country variation. Educational attainment has improved but also with great sub-population variation. Disparity in these two factors may create more inequality in health and income, and may also slowdown reaping demographic dividend at the country level.

The study objective is to understand within-country disparity in fertility, thus consequent age structures, and investment in education by household wealth quintile and trends of disparity in selected sub-Saharan African countries.

## **Data, Measures, and Analytical Approaches**

Data will come from Demographic and Health Surveys (DHS). DHS is a nationally representative household survey, conducted under the DHS Program since 1984. The surveys have provided data on population and health in over 90 countries globally. To date, 31 countries in SSA have conducted two or more DHS, enabling trend analyses spanning up to a quarter century since the late 1980s, using a total of 113 surveys from 31 countries (Appendix 1).

Following measures will be calculated by household wealth quintile, which is constructed based on household condition and selected asset items:

- Average desired number of children,

- Total fertility rate,
- Median age,
- Total, youth, and old-age dependency ratios, and
- School enrollment rates among children 6-10, 11-15, and 16-20 years of age.

Descriptive analyses will be conducted first to assess the pattern by wealth quintile. For illustrative purposes, changes in population pyramids over time in the highest and lowest quintiles will be presented in selected countries (Figure 1). Then, an absolute disparity measure (i.e., absolute difference in estimates between the highest and lowest quintile) will be calculated for each of the indicators above.

Then, trends in estimates in the lowest and highest quintile as well as disparity between the two groups will be assessed. Average annual changes, un-weighted for a population size across the 31 countries, will be measured by using a bivariate, fixed (country-level) effect model. Sub-regional variation in disparity and trends will be examined.

### **Preliminary and Illustrative Results**

Table 1 presents differentials in total fertility rate and school enrollment rate by household wealth quintile, using an example of Kenya DHS 1993 and 2008. Impact of fertility differentials by household wealth on population age structures over time is presented in Figure 1. While at the country level, fertility decline has remained slow, the age structure in the wealthiest quintile has changes to a structure that is similar to those observed in countries with more advanced fertility transition. At the same time, population structure in the poorest quintile has remain nearly constant over the 15 year period. This suggests that demographic-dividend may be realized in sub-populations in the country, potentially increasing inequality in health and economic development within the country. In addition, school enrollment among children varies by household wealth quintile, which may increase economic disparity in the future.

In the paper, the disparity will be assessed across the 31 countries and trends (by wealth quintile as well as of disparity) will be assessed. Sub-regional variation in disparity and trends will be examined.

### **Implications of the Study**

The study will provide systematic assessment of within-country variation in fertility transition and investment in education operationalized at the household-level, two critical elements to realize demographic dividend, in the region. Systematic assessment of disparity by household wealth and its trends will provide policy implications for realizing demographic dividend in the countries.

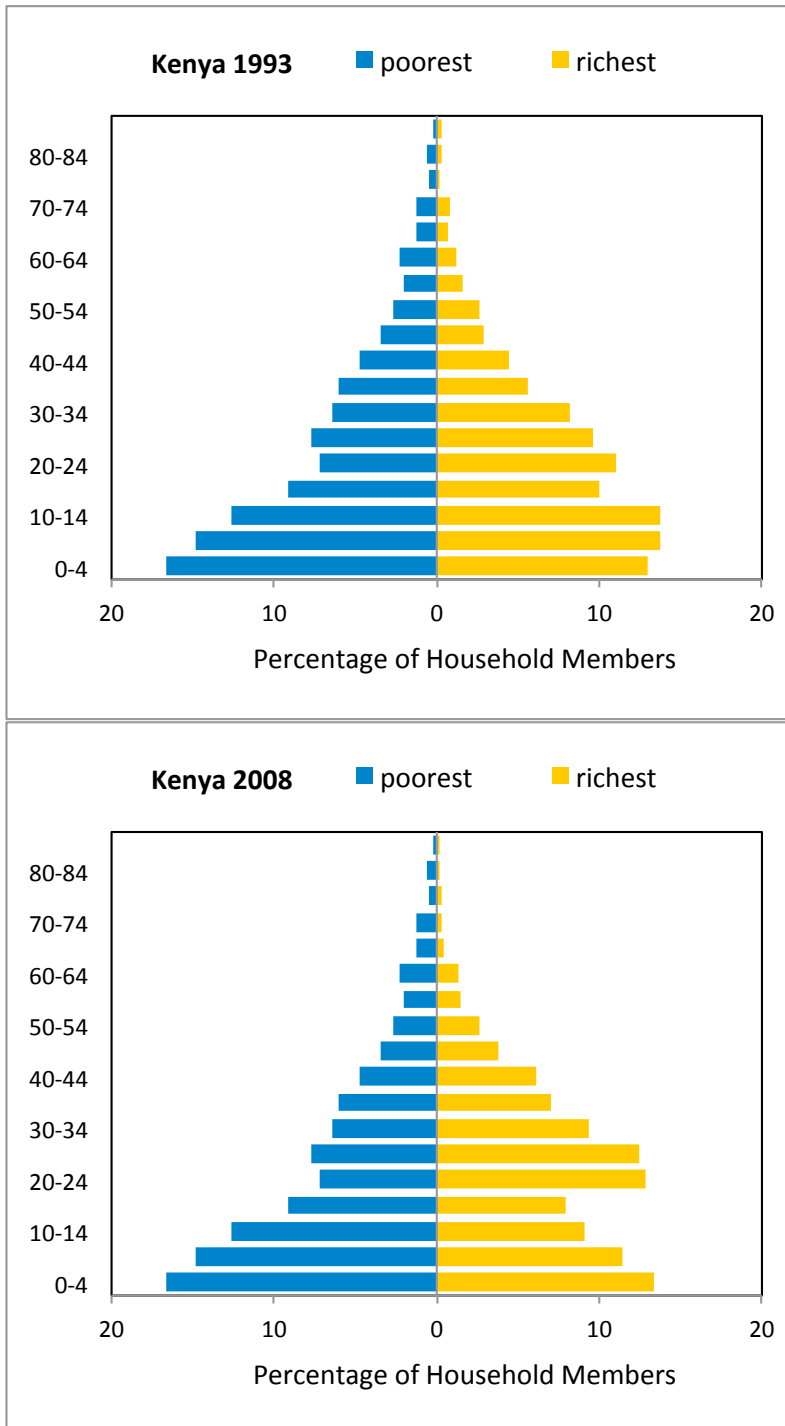
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Table 1 Total fertility rate and school enrollment rate by household wealth quintile: Kenya 1993 vs. 2008/09

Indicator & population	Survey year	
	1993	2008-09
Total fertility rate		
Total	5.4	4.6
By household wealth quintile		
Lowest	7.2	7.0
Second	6.2	5.6
Middle	5.6	5.0
Fourth	5.3	3.7
Highest	3.3	2.9
School attendance (6-10 years) (%)		
Total	66.7	65.2
By household wealth quintile		
Lowest	52.0	49.3
Second	62.4	64.2
Middle	68.9	70.1
Fourth	76.6	73.3
Highest	77.3	75.4
School attendance (11-15 years) (%)		
Total	87.9	94.6
By household wealth quintile		
Lowest	80.7	85.0
Second	87.0	97.5
Middle	92.2	98.2
Fourth	92.1	97.4
Highest	86.2	96.3

Figure 1. Population pyramid in the lowest and highest wealth quintiles over time: Kenya 1993 vs. 2008/09



Appendix 1. List of 31 study countries and surveys

Country	Survey year	Country	Survey year	Country	Survey year
Benin	2011-12	Kenya	2008-09	Rwanda	2010
	2006		2003		2005
	2001		1998		2000
	1996		1993		1992
Burkina Faso	2010	Lesotho	1989	Senegal	2010-11
	2003		2009		2005
	1998-99		2004		1999
	1993		2013		1997
Burundi	2010	Liberia	2007		1992-93
	1987		1986		1986
Cameroon	2011	Madagascar	2008-09	Sierra Leone	2013
	2004		2003-04		2008
	1998		1997	Tanzania	2010
	1991		1992		2004-05
Chad	2004	Malawi	2010		1999
	1996-97		2004		1996
Comoros	2012		2000		1991-92
	1996		1992		Togo
Congo (Brazzaville)	2011-12	Mali	2012-13		1998
	2005		2006		1988
DRC	2013-14		2001		2011
	2007		1995-96		Uganda
Cote d'Ivoire	2011-12	Mozambique	1987		2000-01
	1998-99		2011		1995
	1994		2003		1988-89
Ethiopia	2011	Namibia	1997	Zambia	2013-14
	2005		2013		2007
	2000		2006-07		2001-02
Gabon	2012		2000		1996
	2000		1992		1992
Ghana	2008	Niger	2012	Zimbabwe	2010-11
	2003		2006		2005-06
	1998		1998		1999
	1993		1992		1994
	1988		2013		1988
Guinea	2012	Nigeria	2008		
	2005		2003		
	1999		1999		
	1992		1990		