Child health inequality and opportunities in Sub-Saharan Africa

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1-. Proposal

Health is an important channel affecting individual's opportunities. Health inequality translates into inequalities in other dimensions (education, income, welfare) which are reproducible over time (Sen, 2002; World Bank, 2006; Fleurbaey and Schokkaert, 2012). There are solid evidences of the important role that health plays in the intergenerational transmission of economic status and the development of cognitive abilities (Case et al., 2002, 2005; Oreopoulos et al., 2008; Currie, 2009; Case and Paxson, 2010). Since health inequality begins at birth, correcting it during infanthood is crucial to improving ongoing opportunities for development and fighting against other forms of inequality. These issues are of special concern in the Sub-Saharan Africa (SSA) region because it is one of the poorest and most unequal regions in the world (Thorbecke, 2013; Alvaredo et al., 2018; Chancel et al., 2019). Regarding health, in spite of a considerable improvement in the region, their current levels of life expectancy or under-five mortality are still much lower and higher, respectively, than in developed countries (WHO, 2018, 2019; Liou et al., 2020).

We gather information from Demographic and Health Surveys (DHS) VI and VII, covering 33 SSA countries in the 2009-2016 period, which provides household surveys to estimate child health inequality, and the part of inequality caused by measurable factors, such as family background (e.g., mother's education or wealth of the household), socio-demographic and anthropometric factors of the mother (e.g., mother's height and age), household structure (e.g., number of offspring), household facilities (e.g., water and toilet facilities) and geography (e.g., the region of residence). We perform this analysis for children below five years old, paying special attention to inequality differences by cohorts: 0-1 years old, 1-2 years old, 2-3 years old, 3-4 years old and 4-5 years old. Although we do not have longitudinal information (i.e., information for the same children over time), this analysis by cohorts would provide insights

into the following relevant questions: is health inequality existing during the first year of life corrected during the next four years or, on the contrary, are differences maintained or even accentuated? Which factors are behind the changes in child health inequality along the age distribution?

Our measure of health is the standardized height-for-age z-score, corrected by age (months of age) and gender. Using a reference gender-age group (i.e., girls at 24 months of age from "the WHO standards"), the standardized measure must be converted into a measure in centimeters in order to use inequality indexes such as the Gini or the Mean Log Deviation, MLD (Pradhan et al., 2003). However, the resultant measure of inequality is influenced by the age and gender distribution, and any inequality or decomposition analysis might be influenced by these two factors. To counter this situation, following the literature on labor markets (Katz and Autor, 1999; Kambourov and Manovskii, 2009), for each country, we regress child height (in logs) with the age structure of the child (in months, including linear, quadratic and cubic terms), gender and their cross effects, and take the residual (including the constant term). This adjusted height measure is the one we use in our analysis. Using this adjusted height does not mean that inequality do not change along the age distribution. What we pursue with this adjustment is that our estimations are not caused by the structure of these distributions, i.e., by the composition of gender or children with different ages in a particular country.

To estimate the part of child health inequality explained by the aforementioned set of factors, we follow Ferreira and Gignoux (2011) and estimate an auxiliary regression that relates the (adjusted) child height (in logs) with these factors. Then, we apply the Gini index and the MLD to the fitted part of this regression, thus we calculate the part of inequality explained by these factors, which is our measure of child health IO. We pay special attention to the fraction of inequality that is caused by our set of circumstances IO-ratio (i.e., the fraction of IO with respect to total inequality). We do that for the whole sample and for each age group and show their differences. For each country, we then use a Shapley decomposition approach (Sastre and Trannoy, 2002; Shorrocks, 2013) to measure the fraction of inequality explained by each set of circumstances, for the entire sample and for each age group.

We show that child health inequality is systematically lesser in the cohort of 4-5 years old than in the younger cohorts, which is consistent with the existence of catch-up (Leroy et al., 2015; Desmond and Casale, 2017). For a cross-section analysis, we find a non-significant correlation between the child mortality ratio within each age group and changes in health inequality in posterior age groups, which is an indicative that a mortality-selection bias (Moradi and Baten, 2005; Victora et al., 2010) is not generating this result. However, a more detailed analysis of our results reveals that the aforementioned set of circumstances is impeding a further

reduction of child health inequality in most SSA countries. We find that health inequality caused by these factors increases along the child age distribution in more than 50% of the countries analyzed, and its relative importance (its ratio with respect to total inequality) rises in more than 80%. More concretely, using the Shapley approach to decompose health inequality, we show that family background, followed by the household facilities and the place of residence of the child, are the factors that are contributing more in explaining this result in most of the countries analyzed.