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Infant Health Inequalities and Opportunities in Sub-Saharan Africa

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1. Introduction

Health is an important dimension of well-being and it is a crucial channel affecting individual's opportunities. Health inequality translates into inequalities in other dimensions (education, income, welfare) and are reproducible over time (Fleurbaey and Schokkaert, 2012; Sen, 2002; World Bank, 2006). Since health inequality begins at birth, correcting it during infanthood is crucial to improve future opportunities for development and fight against other forms of inequality. This issue is of special concern in Sub-Saharan African (SSA) countries because they face the highest levels of inequality and poverty worldwide (Thorbecke, 2013; Brunori et al., 2019).

We study health inequality and health inequality of opportunities in children under 5 years old in SSA. We use information from the Demographic and Health Survey (DHS) VI, covering a total of 28 countries in the 2008-2013 period (in next versions of the paper, we will also consider five more countries for the 2013-2018 period from DHS-VII). Our measure of health is the standardized height-for-age (Moradi and Baten, 2005) corrected by age (months of age) and gender, hence it is isolated by the age structure and the gender distribution of the children in each country.

For each country, we first estimate health inequality of our corrected anthropometric measure (Pradhan et al., 2003). Second, we estimate the inequality in health explained by a set of factors (circumstances) related to parental socioeconomic status, household structure, facilities at home and other exogenous factors such as the region or living in urban or rural areas. We refer this latter measure as health inequality of opportunity (IO), following the related literature (Marrero and Rodríguez, 2013; Rosa Dias, 2009). Third, we analyze how our measures of inequality vary according to child's age (less than one year, between one and two, two and three, three and four, and four and five). This latter analysis allows us to figure out when the initial levels of health inequality (for children below 1 year) is being corrected with age or, on the contrary, differences

are maintained or even accentuated. Using a decomposition method (Shapley), we also characterize the factors causing the evolution of age inequality. At the end of the paper, we analyze relevant correlations between our measures of health inequality and macroeconomic variables, such as per capita GDP, economic inequality, quality of institutions, overall health status (life expectancy and child mortality) and prevalence of Malaria and other diseases.

2. Data and methodology

The DHS are nationally-representative household surveys providing data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. The standard DHS consists of a household questionnaire and a woman's questionnaire (ages 15–49). The core questionnaire concentrates on basic indicators and it is standardized across countries to allow comparisons among them. We use the children recode dataset, where the unit of analysis is child under age 5 born to a woman interviewed (Croft et al., 2018).

Our original anthropometric measure of health (standardized height-for-age) suffers from an important problem to measure health inequality because the resultant inequality measures can be influenced by age and gender even if we use a reference sex-age group (Pradhan et al., 2003). To handle this problem, following the literature on wage inequality (Katz and Autor, 1999; Kambourov and Manovskii, 2009), we regress, for each country, child height (in logs) with the age structure of the child (in months, including quadratic and cubic terms), gender and their cross effects, and take the residual (including the constant term).

Using the residual height, we calculate health inequality using the Mean Logarithmic Deviation (MLD) and the Gini index. Next, we follow Ferreira and Gignoux (2011) to estimate an auxiliary regression that relates child health (in logs) with the aforementioned set of child's circumstances. Then, we apply the MLD and the Gini index to the fitted part of this regression and calculate health inequality of opportunity (a lower bound). Finally, we use the Shapley decomposition to characterize the contribution of each circumstance on health inequality (Shorrocks, 2013).

This analysis is performed for each country and alternative subsamples, taking into account the sample design of the surveys (Deaton, 1997; O'Donnell et al., 2008) to ensure its representativeness at national, regional (departments, states) and residence level (urban-rural).

3. Preliminary results

Preliminary (and incomplete) results are shown in the Appendix. Circumstances such as the mother education or wealth, region of residence, age mother, birth order and be born in multiple birth are significant in all countries. Once controlled by wealth, household facilities like drinking water, toilet facility or type of cooking fuel, or other circumstances such as urban residence, the body mass index of the mother or mother's job, are, in general, not significant.

Regarding health inequality, Sierra Leona, Benin and Nigeria are the countries with the highest levels of total inequality and also of heath IO. Gambia and Cameroon show high levels of IO while moderate levels of total inequality. Togo, Burundi and Rwanda experience the lowest levels of total inequality, while Ethiopia, Malawi, Zambia and Zimbabwe show the lowest levels of IO. Comparing both measures, countries such as Cameroon, Nigeria, Uganda and Congo show the highest shares of IO with respect to total inequality (about 32% for the Gini), while Comoros, Zimbabwe, Malawi and Ethiopia experience the lowest shares (about 15% for the Gini). In general, those countries with higher levels of health IO have associated an upward trend of heath inequality and health IO with child age. On the contrary, those countries with lower levels of health IO experience steady (and downward in few occasions) trends of health inequality with age.

A preliminary exploration of cross-section data reveals that our measures of health inequality are uncorrelated with per capita GDP and income inequality, while it is positive correlated with infant mortality and the prevalence of diseases such as Malaria, and negative correlated with secondary education.