DISENTANGLING SELECTION and CAUSALITY in ASSESSING the EFFECTS of HEALTH INPUTS on CHILD SURVIVAL:

EVIDENCE from DEMOGRAPHIC and HEALTH SURVEYS in 14 AFRICAN COUNTRIES[*]

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Abstract

Public policy response to the problem of high childhood mortality in developing countries has primarily focused on encouraging prenatal care and institutional delivery. Since there are no randomized trials of standard prenatal care and hospital delivery, it is difficult to assess the impact of such health inputs on survival chances without accounting for selection processes in the utilization of health facilities. This paper examines the biasing effects of selection on the efficacy of health inputs. Analyses of Demographic and Health Survey (DHS) data from 14 African countries shows a clear selection process in the use health facilities. The extent and direction of the selection process is, however, different across countries. In some of them, failure to take due account for adverse selection process leads to underestimates the beneficial effect of health inputs. In others, such effect is overestimated due to a favorable selection process.

1. Introduction

Many demographic data have a hierarchical or clustered structure. For example, the analysis of childhood mortality involves a natural hierarchy where children are grouped within mothers or families, and the latter, in turn, are grouped into communities. Children from the same parents tend to be more alike in their characteristics than children chosen at random from the population at large. To ignore this grouping risks overlooking the importance of group effects, and may also render invalid many of the traditional statistical analysis techniques used for studying data relationships.

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The present paper addresses the relationship between childhood mortality on the one hand, and use of health care and other socioeconomic variables on the other, based Demographic and Health Surveys (DHS) from 14 African countries (Egypt, Eritrea, Ethiopia, Kenya, Ghana, Malawi, Morocco, Mozambique, South Africa, Sudan, Tanzania, Tunisia, Nigeria, and Uganda).

In contrast to most previous works on the area, where the collection of children is assumed to be an independent random sample, we treat children with the same mother as correlated cases (multi-levels) within the same observation (mother). This is consistent with the data collection in DHS where a nationally representative random sample of women (not children) is selected. Our formulation also enables us to allow for unobserved mother-specific heterogeneity in the models.

A second and important issue that is addressed in this paper is that of selection bias. The public policy response to the problem of high childhood mortality in developing countries has primarily focused on encouraging prenatal care and institutional delivery. Since there are no randomized trials of standard prenatal care and hospital delivery, it is difficult to assess the impact of such health inputs on survival chances without accounting for selection processes in the utilization of health facilities. In this paper we examine the biasing effects of selection on estimates of the efficacy of prenatal care and hospital delivery (health inputs) by using recently developed multi-process models.

The source of bias is the correlation between woman-specific unobserved heterogeneity terms related to child mortality and use of health care); and this is solved by making this correlation part of the model.

In some of the countries studied it is shown that while use of health care reduces mortality risks such beneficial effect may be underestimated if adverse selection effects (due to more frail users of health care) is not accounted for. In others, the effect of health care is

overestimated when favorable selection effects (due to more healthy users of health care) is not accounted for.