



## The Consequences of Fertility For Child Health in Kenya: Endogeneity, Heterogeneity, and Application of the Control Function Approach

### Abstract

This paper investigates the consequences of fertility for child health in Kenya using Demographic and Health Survey data. To take into account serious identification issues in the relationship between fertility and child health, instrumental variable estimation methods are used. Occurrence of first multiple births are used as instruments for fertility in determination of mortality of a non multiple birth child. The control function approach is further used to take into account endogeneity of fertility and heterogeneity arising from unobservable determinants of child health. The results show that endogenous fertility has a positive significant impact on child mortality. The occurrence of first multiple births is a positive significant instrument for fertility across sub-samples. Controlling for endogeneity, non-linearities and heterogeneity however reduces the size of the coefficient of fertility and negates its significance. The insignificance of the control function approach variables suggest that there may be no serious heterogeneity arising from interaction of fertility with unobserved determinants of child mortality. We conclude that failure to control for endogeneity and heterogeneity in analysis would lead to misleading policy conclusions by overstating the impact of fertility on child health.

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### Country where the research takes place

Kenya

### How does the research describe the impact of population/reproductive health on poverty reduction and/or economic growth?

Literature suggests that fertility, child health and general household welfare are closely related, with fertility determining the welfare of children, women, and men. Parents who have more children are expected to commit less of their time and resources to each child but parents who have fewer children are more capable of investing more in the human capital per child and thereby improve the health, education, and lifetime consumption opportunities of their children. The attempts to take into account endogeneity of fertility, heterogeneity and complementarity arising from unobservable determinants of child health, which may be correlated with fertility.

The results show that boys, older children and children of higher birth order are more likely to face mortality than their counterparts. The results further show that maternal characteristics, mothers' education and age have large significant effects of reducing child mortality. Number of health centres and dispensaries per 100,000 persons are associated with lower (but coefficients are insignificant) likelihood of mortality. The amount of rainfall is positively correlated with child mortality, probably due to changes in temperature and outbreak of diseases associated with variations in rainfall patterns. The number of children ever born (endogenous fertility) has a positive significant impact on child mortality.

The IV results suggest that treating fertility as endogenous exaggerates the estimated effect on child mortality. The IV results also show that the presence of a first multiple birth is positively correlated with fertility, while household assets and log of gross national income per capita suggest that fertility declines with household welfare, reflecting the Walrasian effect. Availability of health care facilities is inversely correlated with fertility suggesting the importance of health care in improving reproductive health. The control function approach results show that the coefficient for fertility, fertility residual and the interaction term between fertility residual and fertility are insignificant. The results illustrate the

importance of controlling for endogeneity of fertility and also for taking into account heterogeneity and complementarity that would arise from the correlation of fertility with other exogenous factors in the mortality equation. We are quick to acknowledge that given the complexity of the relationship between fertility and mortality and the nature of the available data, the methodological approach employed in this paper attempts to correct for but does not eliminate simultaneity, heterogeneity, measurement errors and omitted variables.

### **How will the research address a policy need, and what kind of policy lesson is expected?**

In most of Kenya's development period, high fertility and rapid population growth have been viewed more as obstacles to development rather than as a stimulant to economic progress. It is also generally recognized that rapid population growth is not beneficial to the accelerated speed of capital accumulation. Fertility is however thought to be an important determinant of the welfare of women, children, and men. For instance, the quantity-quality of children model postulates that parents who have more children commit less of their time and resources to each of their children. Parents who are encouraged to have fewer children may therefore invest more in the human capital per child, and therefore improve the health, education, and lifetime consumption opportunities of their children.

This study will build on the existing works and thus contribute to the scarce literature on child health and women's reproductive health in Kenya. The general objective of the study is to analyze the impact of fertility on child health in Kenya taking into account endogeneity of fertility and het-

erogeneity arising from unobservable determinants of child health. Based on the research findings, the study will deduce policies recommendations for reducing fertility and improving child health in Kenya. The study addresses the several research questions. What are the determinants of fertility in Kenya? What are the determinants of child health? How are fertility and child health interlinked? What factors condition this link?

### **Methods used**

To take into account serious identification issues in the relationship between fertility and child health, instrumental variable estimation methods are used. Occurrence of first multiple births are used as instruments for fertility in determination of mortality of a non multiple birth child. The control function approach is further used to take into account endogeneity of fertility and heterogeneity arising from unobservable determinants of child health.

### **Data used**

The analysis in this paper utilizes the Demographic and Health Surveys (DHS) data for 2003. The DHS are nationally representative samples of women aged 15 to 49 and their children. The 2003 Demographic and Health Survey utilized a two-stage sample design. The first stage involved selecting sample points (clusters) from a national master sample maintained by the Kenya National Bureau of Statistics (CBS): the fourth National Sample Survey and Evaluation Programme (NASSEP) IV. A total of 400 clusters, 129 urban and 271 rural, were selected, drawn from all eight provinces and 69 districts. From the selected clusters, the desired sample of households was selected using systematic sampling methods.