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The spillover effects of HIV on children in Southern Africa

Introduction

Human Immunodeficiency Virus (HIV), and its full-blown state, Acquired Immunodeficiency Syndrome (AIDS), were first brought to the general public's attention in 1981 (World Health Organization, 2002). For many years, the number of HIV/AIDS related deaths in developing countries have been increasing at such an alarming rate that it is no longer whether it will be an epidemic anymore, but rather how severe it will be. Thus far, the African continent has borne the significant brunt of the damage and the epidemic will likely remain as one of its biggest challenges in the new millennium. In particular, sub-Saharan Africa is currently the most affected region, home to just over 10% of the world's population but more than two-thirds of those living with HIV. Within the region, southern Africa has been the most severely affected (Joint United Nations Programme on HIV/AIDS, 2007).

The human suffering and declines in health associated with HIV/AIDS have been well-documented; however, there are also consequences for the long-run economic growth of a country since HIV/AIDS is focused primarily on adults in their prime working years, which would only exacerbate any existing poverty and inequality. Thus, it is important to better understand how the shortened life span of many southern African adults influences their reproductive and subsequent child rearing decisions, particularly as the living standards and quality of life of much of its inhabitants is already low. Since investment in human capital is vital for the growth and stability of a nation, it is clear that continued parental allocations towards their children are necessary.

Theoretical focus

Children are of importance in African culture- for example, under patrilineal successions it is still customary for the groom's family to pay the bride's family some form of *lobola* (bridewealth- traditionally in the form of animals, but monetary equivalent is accepted nowadays), which transfers the rights over the labor and potential childbearing capacity of the woman to the husband's family, wherein the lack of the latter justifies in her being sent home in disgrace (Women and Law in Southern African Trust, 2003). Since agriculture is often the dominant means of subsistence for rural southern Africans, children can provide additional manual labor in the fields. In addition, as retirement savings are rare in this setting, children can also be interpreted as insurance for old age, as they can support their parents once they are no longer able to work. Given the rates of infant mortality and child survival (to adulthood) for the region, the probability of having a child to take care of you is naturally higher if you have more children.

For families with a constraint on wealth, such as those in the resource poor southern African setting, there is necessarily a tradeoff between the quantity and quality of the children. An increase in the number of children dilutes the resources available to the household since children contribute to household expenses but not income. Parents can either choose to have a large number of children and devote limited resources to each, but the high quantity helps to ensure that a certain number survive, or they may prefer to limit the number of births but invest highly, schooling or otherwise, in each child to ensure success. Using data from twins, Rosenzweig and Wolpin (1980) show that, under certain conditions, an increase in the size of a family has a negative impact on the quality of the children.

Using the works of Becker and Lewis (1973), I consider the utility function $U = U(n, q, y)$ where n is the quantity of children, q is the quality of the children, and y is consumption of all other commodities with budget constraint $I = nqp + yp_y$ where I is full income, p is the price of children, and p_y is the price of all other commodities consumed. Maximizing utility subject to budget constraints yields marginal utilities $MU_n = \lambda qp = \lambda p_n$ and $MU_q = \lambda np = \lambda p_q$, where λ is the marginal utility of money income. The shadow price of children (p_n) is positively related to their quality, and vice versa. Hence, the cost of an additional child is greater the higher their quality is, holding all else constant.

With the high prevalence of AIDS related deaths, parents may not live to old age, and hence the need for old age care diminishes. In turn, this may lower the incentive for parents to have big families or invest in their children since there would be less time for them to recoup the initial cost. For example, schooling requires time and money, not to mention opportunity costs such as foregone earnings. Assuming that parents are altruistic and want to maximize utility, they will derive satisfaction from having more educated or healthier children in the future (Taubman, 1989). Given that AIDS drastically shortens expected lifespan, parents will have less of an incentive to invest in their children since they may not be around to derive utility from their children's future outcome i.e. selfish parents have more to lose with educated children in terms of not being able to, or having a shorter period in which to derive the benefits of their investment. For instance, Fortson (2008) found children living in areas with higher levels of local HIV prevalence to have worse educational outcomes.

Biologically, HIV reduces an individual's reproductive capabilities by impairing the ability of men to produce sperms, and increasing the frequency of miscarriage in women (such as through viral damage, or increased susceptibility to opportunistic infections during pregnancy). Behaviorally the empirical evidence is less clear although it seems to suggest minimal modifications in sexual activities as a result of HIV. Even if they are aware of their HIV status, they may be attempting to conceive to replace children lost to HIV, or hastening to confirm their fecundity given the reduced life span (Noël-Miller, 2003). Young (2005) found that the HIV epidemic is lowering fertility in sub-Saharan Africa.

Data

This study will utilize cross-sectional data from Demographic and Health Surveys (DHS), which is conducted by the Monitoring and Evaluation to Assess and Use Results (MEASURE) program, and sponsored by the United States Agency for International Development (USAID) as well as contributions from other donors. A relatively standardized questionnaire addressing fertility, family planning, maternal and child health, as well as child survival, HIV/AIDS, malaria, and nutrition is administered to a large number of households in many developing countries, randomly chosen so as to be nationally representative. HIV testing is also done for a portion of respondents, and allows for test results to be linked to socioeconomic and demographic data.

Given the high HIV prevalence rates in the region, this study will be conducted for four countries in southern Africa which all have HIV testing in their most recent DHS (years given in parentheses) – Lesotho (2004), Malawi (2004), Swaziland (2006), and Zimbabwe (2006). Furthermore, all four countries are members of the Southern African Development Community, and thus are in similar contextual settings, which will facilitate the cross-country comparison of results.

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Research Methods
<u>Analysis Plan</u>

Propensity Score Matching (PSM) will be used in this study. PSM reduces bias when assessing average treatment effects in nonrandomized, observational data by comparing the outcomes of treated and control groups who are plausible counterfactuals – i.e. individuals who are virtually identical except for treatment. In my model, the "treated" will be HIV positive individuals, and the "controls" will be HIV negative individuals. Since there are multiple characteristics for matching, the propensity score method summarizes the baseline (or pretreatment) characteristics into a single variable and thereby avoids any problems with dimension (Becker and Ichino, 2002). I will also use a variety of matching methods to check the robustness of my results.

<u>Dependent Variables</u> -

Respondents in all countries were asked what their ideal number of children was, as well as the ideal number of each gender; this will be used to represent the *quantity* of children.

The *quality* of children will be proxied by the following responses, all indicative of parental choice. First, questions on whether children slept under a bed net the previous night (yes/no), and immunization coverage (for young childre) will represent parental investment in health. Second, surveys included questions on the the height and weight measurements of children, which will represent parental investment in nutrition.

<u>Independent Variables</u> –

The key independent variable will be binary, indicating whether an individual is HIV positive or negative. Given the research question, the sample will be restricted to those who were tested for HIV, and will exclude the very few who had indeterminate results.

<u>Controls</u> –

Parental age (and age squared), gender, and marital status will be included as these can plausibly affect the outcome of interest. The educational level of the parents will be also be included since education is correlated with literacy, both of which affect the ability to understand the need for other child quality aspects such as the need for bed nets and certain foods. Similarly, the more educated are probably better versed in fertility planning issues.

Other household controls will include whether it is an urban or rural residence, and an index for household wealth, constructed through asset ownership. The size of the household will also be controlled for, since those can have a significant effect on the distribution of resources.

Expected findings

Preliminary results indicate that the desired number of children does not vary by HIV status. Mothers being HIV positive is also shown to have a negative impact on parental investment in the health and nutrition of their children, although the significance of the results varies by country.

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