Reviewer's report

Title: Differentials of fertility in North and South Gondar zones, Northwest Ethiopia

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Reviewer: Amy Tsui

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This study examines correlates of large and small family sizes (high or >4 children versus low 4 or less children) based on data from a late 2007 sample survey conducted in two zones of Amhara region in Ethiopia. The sample sizes are substantial -- 1011 women in the high and 1413 women in the low fertility categories, both within the age range of 25 to 49 years.

In addition to the sample power strength of the survey, the study has a number of other important features (numbered). These are discussed below, with comments (numbered with lower case letters) on related analytic or discursive weaknesses that, if addressed, should reinforce the study's contributions.

1. The study addresses a major development issue for Ethiopia, the high level of fertility that in a context of widespread rural poverty impedes private household and individual, as well as national, efforts to improve living situations.
   a. The manuscript identifies to overpopulation or high population growth, as well as uncontrolled or unregulated fertility, as reasons for conducting the study. It does not articulate explicitly how fertility can drive population growth. The paper could cite annual population growth rates and their doubling times and then state that fertility is the main driver of population growth (this being the balance of births, deaths and net migration). An explicit rather than just implicit link of fertility to population rates of change is needed.
   b. The 2000 and 2005 total fertility rates from the EDHS should be cited at the beginning, rather than end of the paper (in the discussion). In addition, the unwanted TFR should be cited, along with the low contraceptive use and high unmet contraceptive need levels. Having this information in the beginning will establish that there is recognition of excess fertility and need for contraceptive access (which is an MDG-5 target).

2. The analysis explores a wide range of potential correlates, broadly grouped into socioeconomic, demographic, proximate determinants (age at marriage, contraception) and attitudinal factors. This is good for data exploration but less helpful in focusing the added knowledge contribution.
   a. There is no apparent underlying theoretical framework to guide the inclusion of variables and they range widely in type.
   b. The backward and forward stepwise regression approach is an atheoretical approach, which if there were no apriori frameworks or policy implications being
drawn from the results, would be acceptable. However, the literature (especially from in the early 1980s) is rife with frameworks that focus on socioeconomic correlates of individual fertility and also proximate determinants of fertility (which beyond the two mentioned also extend to lactational amenorrhea from breastfeeding, spontaneous or induced abortion, and pathological sterility from sexually transmitted infections). Some of the variables that survive this statistical selection in Table 3 seem arbitrary (e.g., knowledge of the fertility cycle, attitude toward future contraceptive use).

c. The authors should also acknowledge that many covariates may be the result rather than the determinant of high or low fertility. Household expenditures and infant mortality experience will rise with more children. Being unmarried surely constrains having many children but not knowing when divorce/separation may have occurred relative to the number of children is a limitation. Because the data are cross-sectional, the results must be interpreted as associations only and not in causal terms as predictors or impacts (e.g., para 1 on p. 17).

d. Similarly the woman’s attitude towards contraceptives and acceptability of wife beating and female circumcision and so on are at best correlates of current family size.

3. The analysis uses a case-control approach which is frequently applied to epidemiologic outcomes, particularly disease exposure.

a. This may not be the optimal modeling strategy given the 50:50 split in the outcome (classification as high or low fertility) and logistic regression estimation.

b. The mean number of births (and standard deviations) for each of the two groups should be given to enable readers to gauge the dispersion within.

c. Two preferred alternatives for the modeling are to conduct 1) a multinomial logistic regression with 3 or 4 family size categories (e.g., small, medium, large, and very large) or 2) an ordinary least squares regression with the number of children as the outcome. The advantage of #1 is that it will better delineate the strength of the covariates’ associations, possibly addressing why no and primary schooling have the same effect on high and low levels. The advantage of #2 is it is more suitable than the 50:50 split for logistic modeling.

4. Table 4 does not substantially add to the paper and I recommend eliminating it. One key reason is that gender preference for the first born is retrospectively reported and can be heavily rationalized relative to the number and sex composition of completed fertility.

5. The Discussion section can be significantly shortened, particularly in view of the cross-sectional nature of the analysis. It is important not to overstate causal linkages in the absence of longitudinal data. In particular, in view of the unexpected differentials in fertility by education, the authors should restrain from drawing strong policy implications. Similarly because contraceptive prevalence was not statistically associated with being in the high versus low fertility group, it is not wise to advocate for family planning (although I believe this is an artifact of the modeling approach).

Minor comments
1. Abstract, Objectives: The study is not about fertility preferences but rather fertility behavior.

2. P. 10 bottom, last complete sentence: It is probably not necessary to provide detail about the survey manual.

3. P. 14, line 4: “Nuisance” is usually applied to uncontrolled error/variance, as opposed to intentional controls on confounding.

4. Tables 1 and 2: give the %s as well as provide the mean number and SD of births per group.

5. Why are p values only given for Table 3?

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.