Documenting Male Fertility in Developing Countries with Demographic and Health Surveys

An Assessment of Three Methods

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Background

• Little research on male fertility
  – Fertility research first formulated in a western context (Greene & Biddlecom, 2000)
    • Assumption of coincident interests and behavior
  – Lack of data, data quality

• Why study male fertility
  – Own reproductive interests and experience
    • Theoretical and practical implications
  – Interests for other fields, methodological reasons, etc.

• Data widely available but untapped
Objectives

• Measuring age-specific fertility rates in developing countries with existing data
  – Demographic and Health Surveys
  – Comparison of 3 methods

• Descriptive results
  – Levels, age patterns and trends
  – Comparisons with female fertility
    • Different experiences
    • Convergence over time
Demographic and Health surveys

• Widely available
  – More than 300 surveys conducted in developing countries since the mid 1980s
  – Open access data
  – Standardized

• 3 questionnaires
  – Household questionnaire (all surveys)
  – Women’s questionnaire (all surveys)
  – Men’s questionnaire (most surveys), usually up to ages 59 or 64
Period age-specific male fertility rates

- Births by age of father at birth
- Exposure in age group (person-years)
Data on male fertility in DHS

• No birth history
• Limited data in some men’s surveys
  – Date of birth of last child
  – Number of children ever born
• Useful data in household surveys
  – Surviving children, father’s line number if father in the household, father’s survival status
DATE OF LAST BIRTH
Date of last birth
(men’s surveys)

Source: 1998 Ghana DHS, men’s questionnaire
Date of last birth
Schmertmann (1999)

\[
\lambda_i = \frac{\text{number of visible births in age group } j}{\text{visible exposure in age group } j}
\]

Source: adapted from Schmertmann (1999)
CRISSCROSS METHOD
(CHILDREN EVER BORN)
Crisscross
Schmertmann (2002)

Figure 1: Illustration of Lexis diagram and formula for estimating fertility rates with the crisscross approach (adapted from Schmertmann, 2002).

\[ \lambda = \left( \frac{1}{2n} + \frac{1}{2t} \right) \cdot (C - A) + \left( \frac{1}{2n} - \frac{1}{2t} \right) \cdot (B - D) \]  
(Eq. 1)
OWN CHILDREN METHOD
(HOUSEHOLD DATA)
### Surviving children and fathers (household survey)

<table>
<thead>
<tr>
<th>LINE NO.</th>
<th>USUAL RESIDENTS AND VISITORS</th>
<th>RELATIONSHIP TO HEAD OF HOUSEHOLD*</th>
<th>RESIDENCE</th>
<th>SEX</th>
<th>AGE**</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
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<tr>
<td>01</td>
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<td></td>
<td>YES NO</td>
<td>M</td>
<td>F</td>
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<td>02</td>
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<td>YES NO</td>
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<tr>
<td>03</td>
<td></td>
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<td>YES NO</td>
<td>M</td>
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</tr>
</tbody>
</table>

**Notes:**
- Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household.
- What is the relationship of (NAME) to the head of the household?
- Does (NAME) usually live here?
- Did (NAME) stay here last night?
- Is (NAME) male of female?
- How old is (NAME)?

**Questionnaire Sections:**

1. **Is (NAME)’s biological mother alive?**
   - If Alive: Does (NAME)’s biological mother live in this household?
   - If Yes: What is her name? Record mother’s line number. If not living in household write ‘00’.

2. **Is (NAME)’s biological father alive?**
   - If Alive: Does (NAME)’s biological father live in this household?
   - If Yes: What is his name? Record father’s line number. If not living in household write ‘00’.

**Example Entries:**

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</tbody>
</table>
Own children method

• Drop children whose father is deceased
• Match children with fathers
• Link unmatched children to potential fathers
  – Imputation of age of father among unmatched children
  – Link to a male of the same age as the imputed age of father
• Reverse survive children
  – Using survival probabilities from female birth histories
• Age specific fertility rates
  – 5-year age groups
  – TFRs (15-79)
  – Fertility trends for 15 years preceding each survey
COMPARISON OF METHODS
Three methods
Own children and Crisscross
Own children and date of last birth

Bolivia 1993-1998

Cameroon 1993-1998

Chad 1991-1996

Dominican Republic 1991-1996

Guinea 1994-1999

Kazakhstan 1994-1999
Comparisons among females

Rwanda 2000-2005
Comparisons among females

Rwanda 2000-2005

Fertility rate

Age

0.0 0.1 0.2 0.3 0.4 0.5

20 25 30 35 40 45

DLB OC Direct CC
Comparisons among females

Rwanda 2000-2005

Fertility rate

Age

DLB
OC
Direct
CC
Comparisons among females

Rwanda 2000-2005

Ghana 1993-1998

Burkina Faso 1998-2003

Uganda 1996-2001
Strengths and limitations of the male own children method

• Strengths
  – Most regular and plausible curves
  – Full age range (15-79)
  – Possible with virtually all DHS surveys
  – May be adapted to census data
  – Possible to reconstruct trends
  – Does not rely on fathers’ reporting of children
  – Validated among females with direct methods

• Limitations
  – Possibly affected by migration of fathers
  – Assumptions needed to analyze fertility differentials
Male and female fertility compared

Age-specific fertility rates
Senegal 2014

TFR=10.7
Male and female fertility compared

Fertility transitions
Reconstruction of Male TFRs
Reconstruction of Male TFRs
Reconstruction of Male TFRs

Zimbabwe

- Raw estimates from single surveys
- Raw estimates from pooled surveys
- Lowess estimates from pooled surveys

Male TFR

Date

1980 1990 2000 2010
Reconstruction of Male TFRs

Zimbabwe

- Raw estimates from single surveys
- Raw estimates from pooled surveys
- Lowess estimates from pooled surveys

Male TFR vs Date

1980 1990 2000 2010
Reconstruction of Male TFRs
Reconstruction of Male TFRs

Zimbabwe

- Raw estimates from single surveys
- Raw estimates from pooled surveys
- Lowess estimates from pooled surveys

Male TFR vs Date

1980 1990 2000 2010
Conclusion

• Male age-specific fertility rates can be estimated with existing data
  – Own children method
  – Large number of countries, full age range, fertility trends
• Male and female fertility differ widely in some countries
  – Male TFR >> Female TFR
  – Very different fertility experiences
• Convergence between male and female TFR with fertility transition
• First step – further research
  – Determinants, theories
  – Refinement of methods, reconstructing birth histories -> micro analyses, parity progression, etc.