Gender Gaps in Completed Fertility

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Motivation

• A large literature exists analyzing fertility pattern and trends
• Based on FEMALE fertility data
  Most surveys ask only women about their child-bearing.
• Yet, for any couple, male & female fertility need not coincide:
  • Polygyny
  • Divorce & remarriage
  • Death & remarriage
• Even in aggregate fertility may be different by gender!
  → Possible because of population growth.
Research Question

- Does it matter whose fertility is considered?
- Would “fertility facts” change if one used male fertility instead?

Project is a fact finding mission!
→ input into other studies.
Why is this important?

1. Well-documented that men desire more children than women. 
   → Does this necessarily lead to conflict? 
   Or does preference gap translate into gap in realized fertility?

2. Investments in children depend heavily on resources of fathers. 
   → thus it matters how children are spread across men.

3. Particularly interesting/important in polygynous countries. 
   → focus on Africa.
• How to compare fertility of men and women?

• Multiple possibilities.

• We do it by birth cohort. i.e. compute completed fertility for women born in year $x$ and for men born in the same year.

• Data issues: men complete fertility later in life than women, so take men aged 50-60. However, women are in survey only up to age 49. → solution: compare men and women from different surveys: 10 years apart. Gives us same birth cohorts.
Recent waves of the Demographic and Health Surveys (DHS) include fertility questions for men.

Select countries based on male sample size (and appropriately spaced female surveys).

Benin, Burkina Faso, Ethiopia, Madagascar, Malawi, Rwanda, Zambia, Zimbabwe.

Surveys between 1993 and 2011.
The Samples

<table>
<thead>
<tr>
<th>Cohort</th>
<th>DHS</th>
<th>Age</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>1947-51</td>
<td>1996-2006</td>
<td>442/211</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1952-56</td>
<td>2000-2011</td>
<td>1194/541</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1949-53</td>
<td>1997-2008/09</td>
<td>500/387</td>
</tr>
<tr>
<td>Malawi</td>
<td>1950-54</td>
<td>2000-2004/05</td>
<td>766/175</td>
</tr>
<tr>
<td>Rwanda</td>
<td>1951-55</td>
<td>2000-2010</td>
<td>727/255</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1951-55</td>
<td>1999-2005/06</td>
<td>414/332</td>
</tr>
</tbody>
</table>

+ additional cohorts for some countries
Main Findings

1. Male average fertility $>>$ female average fertility.
3. Fertility preference gap $\rightarrow$ realized gap.
4. Demographic transition started earlier and was steeper from male perspective.
## Finding 1: Gender Gap in Fertility

<table>
<thead>
<tr>
<th>Country</th>
<th>Cohort</th>
<th>Mean # Children Women</th>
<th>Mean # Children Men</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>1947-51</td>
<td>7.3</td>
<td>11.6</td>
<td>4.3***</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1951-55</td>
<td>7.5</td>
<td>10.2</td>
<td>2.8***</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1952-56</td>
<td>7.1</td>
<td>8.4</td>
<td>1.3***</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1949-53</td>
<td>7.0</td>
<td>6.8</td>
<td>-0.2</td>
</tr>
<tr>
<td>Malawi</td>
<td>1950-54</td>
<td>7.0</td>
<td>8.7</td>
<td>1.7***</td>
</tr>
<tr>
<td>Rwanda</td>
<td>1951-55</td>
<td>7.3</td>
<td>8.6</td>
<td>1.3***</td>
</tr>
<tr>
<td>Zambia</td>
<td>1948-52</td>
<td>7.7</td>
<td>8.5</td>
<td>0.8**</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1951-55</td>
<td>6.1</td>
<td>6.8</td>
<td>0.7***</td>
</tr>
</tbody>
</table>
Example: Burkina Faso
How is this possible?

- $f_t^m$ male fertility, cohort born in $t$.
- $M_t^k$ size of male cohort born in $t$ at age $k$.
- Analog for women: $f_t^w$, $W_t^k$.
- Assume men have children at age $k$ and age gap $g$.
- Fertility “market clearing” in year $t+k$:

$$f_t^m M_t^k = f_{t+g}^w W_{t+g}^{k-g}$$

- Add constant pop growth ($\gamma$) and mortality ($\pi_w, \pi_m$).

$$\frac{f_t^m}{f_{t+g}^w} = \frac{W_{t+g}^{k-g}}{M_t^k} = \left(\frac{1 - \pi_w}{1 - \pi_m}\right)^k \left(\frac{1 + \gamma}{1 - \pi_w}\right)^g \left(\frac{W_t^0}{M_t^0}\right).$$
### Finding 2: Fertility Inequality Higher for Men

<table>
<thead>
<tr>
<th>Country</th>
<th>Cohort</th>
<th>SD Women</th>
<th>SD Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>1947-51</td>
<td>2.776</td>
<td>6.021</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>1951-55</td>
<td>2.632</td>
<td>5.251</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1952-56</td>
<td>2.812</td>
<td>3.503</td>
</tr>
<tr>
<td>Madagascar</td>
<td>1949-53</td>
<td>3.768</td>
<td>3.823</td>
</tr>
<tr>
<td>Malawi</td>
<td>1950-54</td>
<td>3.167</td>
<td>3.660</td>
</tr>
<tr>
<td>Rwanda</td>
<td>1951-55</td>
<td>2.503</td>
<td>3.254</td>
</tr>
<tr>
<td>Zambia</td>
<td>1948-52</td>
<td>3.004</td>
<td>4.643</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>1951-55</td>
<td>2.875</td>
<td>3.768</td>
</tr>
</tbody>
</table>
Example: Burkina Faso
Male and Female Fertility, Burkina Faso: cohort 1951–55 –children born–

- women (DHS 1998)
- men (DHS 2010)
Finding 3: correlation btw desired and actual gap

\[ y = 0.2287x + 1.4472 \]

\[ R^2 = 0.0636 \]
Finding 4: Demographic Transition Steeper for Men

Average Fertility

Birth cohort

Benin (women) Benin (men) Burkina Faso (women) Burkina Faso (men)
Malawi (women) Malawi (men) Zimbabwe (women) Zimbabwe (men)
Summary

- Used unique data on male completed fertility.
- Main findings:
  - Completed fertility of men is higher than of women. (and yes, this is possible in the aggregate!)
  - Fertility inequality much higher for men than women. (but differences vary across countries)
  - A novel explanation for the gender gap in desired fertility. (and some measurement of how important this is)
  - Size/speed of demographic transition depends on gender considered.
- Lessons for theory: more 2-parent models needed!