L13: Fertility in LDCs: Determinants and Policy Implications

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Recap of Previous Lecture

- Effects of high population growth on development: generally believed this is a negative effect
- Reviewed facts concerning growth of population
- Demographic transition: population growth accelerates in second stage owing to drop in mortality rates, but decelerates thereafter as fertility rates drop
- Eventually population growth returns to low positive, zero or negative levels
Importance of Fertility Behavior

- Fertility behavior is key
- Variations in fertility overwhelm variations in mortality
- Why poor countries have higher population growth rates
- Why population growth rates fall in later stages of demographic transition
Determinants of Fertility (read Schultz essay, Ch 9 in UPP)

- Economic theory of fertility: Becker’s theory
- Sociological determinants: Easterlin’s theory
- Other determinants important in LDCs
Economic Theory of Fertility (Becker)

- Becker’s theory views children as ‘consumption’ by parents
- Parents derive joy from having children, and satisfaction from their children’s success
- Make sacrifices in order to bear, rear and educate children
- Costs: Take time off work, clothe and feed children, education and health expenses
Parental utility depends on:
- number of children
- ‘quality’ of children
- other consumption good
- leisure

Each of the above is costly; parents trade off benefits and costs

Parental resources: wealth, time and skill/education
Parental Choice Problem

- Maximize utility function $U(n, e, c, l)$
- Subject to budget constraint

$$c + n \cdot e \cdot t = w(e_p)(1 - l - nr) + W$$

- $c$ is household consumption, $n$ is number of children,
- $e$ is education chosen for children, $t$ is tuition cost
- $w(e_p)$ is parental wage rate (education), $l$ is parental leisure,
- $r$ is child-rearing time away from work, $W$ is parental wealth
Determinants of Parental Choices

- Fertility $n$, child education $e$, consumption $c$ and leisure $l$ are increasing in parental wealth $W$.
- Effect of higher wage rate $w(e_p)$ on fertility?
  - income effect (positive)
  - substitution effect (negative)
- If substitution effect dominates (more likely for mothers), more educated parents will have fewer children.
- More educated parents select more education for their children.
Implications

- Suppose human capital is the primary source of wealth \( (W = 0) \), i.e., for vast majority of population which excludes landlords or capitalists.
- Then rising income/education of parents (particularly women) likely to induce them to have fewer but better educated children.
- Shift from ‘quantity’ to ‘quality’.
Some Other Implications

- Fertility falls if child-rearing costs rise.
- If education cost falls, parents are induced to switch to the ‘high quality-low quantity’ strategy, and fertility falls.
- Urbanization likely to be associated with fall in fertility rates: lower education costs, higher childcare costs.
Sociological Theories of Fertility (Richard Easterlin)

- Sociological Factors that affect fertility: social norms concerning
  - age at marriage
  - family size and use of contraceptives
  - education
  - women’s labor force participation
Empirical Evidence

- Strong and robust evidence that rising women’s education (above 4 years of schooling) is associated with a decline in fertility
- Countries with TFR 6 and above have female illiteracy rates of 60% and above; those with TFR 5 and below have average female illiteracy rate of 23%
- Father’s education has comparatively negligible (and often positive) effect on fertility
- Family wealth and p.c.i. has positive effect, controlling for parental education
- Urbanization has negative effect
Table: Cross-Country Regression of Total Fertility Rate (Schultz)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years Female Education</td>
<td>-0.551***</td>
</tr>
<tr>
<td>Years Male Education</td>
<td>0.179</td>
</tr>
<tr>
<td>Log GDP per capita</td>
<td>0.517**</td>
</tr>
<tr>
<td>% population urban</td>
<td>-.008?</td>
</tr>
<tr>
<td>% population agri.</td>
<td>.019</td>
</tr>
<tr>
<td>% population Catholic</td>
<td>.012**</td>
</tr>
<tr>
<td>% population Protestant</td>
<td>.024**</td>
</tr>
<tr>
<td>% population Muslim</td>
<td>.012**</td>
</tr>
<tr>
<td>family planning cost</td>
<td>-.000</td>
</tr>
<tr>
<td>intercept</td>
<td>5.79</td>
</tr>
</tbody>
</table>

$R^2 = 0.722$
Additional Determinants Important in Developing Countries (Kotwal, UP, Ch. 10)

- Children as Income Earners: Child Labor
- Children as Old-Age Security
- Son-Preference
- Infant Mortality
- Women’s Empowerment
Child Labor

- Household tasks: collecting firewood, water; grazing cattle; care of younger siblings
- Working for wage for employers; often work longer hours than parents (e.g. Himalayan foothills)
- Mead Cain study for Bangladesh: boys earn by age of 15 sufficient to cover all expenditures incurred by parents on their behalf
### Table: Child Labor in 36 LDCs (UNICEF survey, 2000)

<table>
<thead>
<tr>
<th></th>
<th>Part. Rate</th>
<th></th>
<th>Part. Rate</th>
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<th>Hrs/Wk</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>5-9</td>
<td>10-14</td>
<td>5-9</td>
<td>10-14</td>
<td></td>
<td>10-14</td>
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<tr>
<td><strong>Market Work:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Paid</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Unpaid</td>
<td>4</td>
<td>7</td>
<td>4</td>
<td>7</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Family Bus./Farm</td>
<td>12</td>
<td>30</td>
<td>12</td>
<td>30</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td><strong>Household Tasks:</strong></td>
<td>51</td>
<td>79</td>
<td>51</td>
<td>79</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>
Figure 1: The Relationship between Economic Status and Economic Activity, 2000

Child Labor Incidence within Vietnam, 2000

Figure 1: The Relationship between Economic Status and Economic Activity, 2000

Tanzania  
Burundi  
Ethiopia  
Nigeria  
Yemen  
Zambia  
Mali  
Kenya  
Ghana  
Nepal  
Bangladesh  
Pakistan  
India  
Guinea  
Philippines  
Indonesia  
China  
Egypt  
Columbia  
Iran  
Turkey  
Thailand  
Brazil  
South Africa  
Mexico

Figure 2: Living Standard Improvements and Child Labor in Vietnam in the 1990s


Children as Old-Age Security

- LDCs lack financial assets in which working adults can save for their old age
- Poor health care services: old parents are cared for by their children at home (in India 80% of old parents live with adult sons; as against 15% in the US)
- Widows in Bangladesh ability to hold on to land assets owned depends on whether they have a grown son living with them (study by Mead Cain)
- Fertility decline in mid-19th century UK related to emigration of children to the US (Jeff Williamson study)
Son-Preference

- Strong preference for sons rather than daughters in patrilineal societies
- Sons are needed to look after family property and parents in old age
- Dowry: bride’s parents pay son’s parents
- Urge to guarantee there will be sons: raises fertility
- 7-8% ‘missing women’ in China and India, sex-ratio imbalance getting worse in last two decades
Infant Mortality

- If risk of child mortality (or emigration) is high, self-insurance motive leads to ‘hoarding’
- Risk: a child born may not be male, a male child born may not survive beyond age 5 owing to infant mortality, and a male child that survives may emigrate
- Let $r$ denote this risk (bigger than a half, maybe .7)
- How many children must you give birth to, to ensure you will have a adult son who will be around to look after you with 95% probability?
Infant Mortality, continued

- Solve for smallest integer $n$ for which $1 - r^n \geq 0.95$
- If $r = 0.5$, need at least 5 children
- If $r = 0.7$, need at least 8 children
- Hence higher infant mortality or emigration rates raise fertility rate
In the following figure, note that once infant mortality had fallen to around 70 (which occurred around 1910 in Sweden -- see figure above), then the fertility rate declines rapidly. In a similar way, there is a close correspondence between fertility and infant mortality across the world today.
These differences include:

1. A later (20th.C.) transition in LDCs.
2. A faster decline in death rates (50 yrs. vs. 150 yrs.).
   Death control has been imported from MDCs and applied rapidly. In most LDCs childhood mortality remains high, but 1/3 to 1/2 what it was 50 years ago. However the most rapid improvements have occurred in places in which female literacy has increased the most. Therefore, it is not simply the application of modern drugs that is responsible but, rather, behavioral changes that have improved survival (e.g. changes related to hygiene). These types of behavioral change are readily adopted because, in so far as they improve survival, they act to support traditional values that favor life over death in almost all societies.
3. A relatively longer lag between the decline in death rates and the decline in birth rates (death rates are lower before decline in birth rate starts). Fertility change requires a more conscious effort than mortality change and requires social and behavioral changes that conflict more with traditional values. This has been slower coming in LDCs because economic change has been delayed in many cases. The same economic pressures that existed in urban areas 100 years ago in MDCs have been slower to develop in LDCs because many, particularly in Africa, remain very rural. Hence, attitudes and values have been slower to change.
4. Higher maximum rates of growth in LDCs: over 3.5% growth per year at the height of Stage 2 in Mauritius and Mexico, compared to 1.3% in the same stage in Sweden. Also, therefore, age structures are far younger in LDCs. These data yield doubling times of 20 years versus 55 years.

But the greatest similarity concerns the fertility behavior of both populations (at different times) with respect to infant mortality. Here shown for Brazil, Chile and Sweden.
Female Empowerment

- Women empowerment strongly associated with higher labor force participation of women and higher women’s wages, which directly lower fertility.
- Additional factor: enhanced bargaining power of women within households associated with more spending on children health and education, and lower fertility.
- Mothers have a higher relative preference for quality over quantity of children compared to fathers.
- South Indian states with matrilineal societies have substantially lower fertility, infant mortality rates and higher school enrollment rates compared with North Indian states.
Property Inheritance Laws

- If death of parents results in equal division of property across all children, large families dissipate their wealth.
- Hence equal division laws discourage parents from having too many children.
- Conversely, if property goes to eldest son or sibling, there is no disincentive to have more children.
- This matters less in societies where bulk of wealth is in the form of human capital since it cannot be bequeathed.
Role of Social Norms

- Strong social norms concerning how many children to have, and whether to use contraceptives
- Particular norms in sub-Saharan Africa which encourage higher fertility:
  - ancestor cult
  - polygyny
  - extended family/kinship ties
  - communal land tenure
Summary of Reasons why Fertility Declines with Development

- Rising access to schooling
- Higher education, labor force participation rates, wages and empowerment of women
- Fall in child labor
- Parents old age security: children emigration, financial development, social security
- Falling infant mortality
- Urbanization: Nuclear families, rising childcare costs, cheaper birth control methods
Policy Implications

- Wide variations in fertility even within any given p.c.i. category (recall cross-country regression from previous lecture)
- Role of policies:
  - human development
  - child labor
  - women’s empowerment
  - old-age security
  - urbanization
  - subsidized family planning services
Are Coercive Methods Warranted?

- Corecive Policies: China’s One Child Policy; Forced Sterilizations in India 1975-77
- Very unpopular, cause great hardship to poor households (given absence of social security)
- No evidence these are necessary to lower fertility rates, if other policies of human development and modernization are in place
Some Recent Research Findings

- Fertility decline in Brazil: TFR was 6.3 in 1960, 5.8 in 1970, 4.4 in 1980, 2.9 in 1991, 2.3 in 2000
- However government did not follow any policy to control population growth rates directly
- Education levels still quite low in 2000: 39% in urban and 73% in rural areas had less than 4 years of schooling
- One factor related to fertility decline: rise in TV ownership (8% in 1970 to 81% in 1991)
- What's the connection?
Some Recent Research Findings, contd.

- Exposure to TV *novelas* or soap operas of Rede Globo channel explains part of the decline (La Ferrara, Chong and Duryea, *American Economic Journal: Applied*, 2012)
- The soap operas portrayed successful, happy rich/middle class female characters with no or one child
- In contrast to women in poor families who had many children and were very unhappy
- Exposure to Globo channel explains statistically significant 5% fertility decline especially among poor, less educated women
Some Recent Research Findings, contd.

- One month electricity blackout during May-June 2008 in island of Zanzibar (Burlando, ‘Power Outages, Power Externalities and Baby Booms,’ *Demography*, 2014)
- 17% rise in births 8-10 months later
- Only in areas with electricity; no effect on areas that had no electricity at all
- The blackout induced adult males and females to spend more time at home in the evenings