Sex imbalances at birth in 2010: some theory and a few recent estimates

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### About sex ratios

- Sex ratios are measured as number of men per 100 women with e.g. 105 reflecting a 5% excess of men
- Boys are more numerous than girls at birth and the sex ratio at birth (SRB) is around 105 male births per 100 female births
- Modest biological variations across populations are observed in the sex ratio at birth, within a range of 104-106
- Sex ratios vary by age under the influence of
  - Mortality differentials by sex (higher male mortality)
  - Migration (for studies, marriage, labor, retirement etc.)
- Selective underenumeration of people and births may disturb sex ratio estimation

### Biology and society

<table>
<thead>
<tr>
<th>Biological and environmental factors</th>
<th>Sex ratio</th>
<th>Gender preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity, mother’s age and parity, period effects</td>
<td>Higher probability of male conception</td>
<td>Selective pre-implantation diagnosis, sperm sorting</td>
</tr>
<tr>
<td>Intra-uterine mortality (spontaneous abortions)</td>
<td>Sex ratio at conception</td>
<td>Abortions after prenatal sex determination</td>
</tr>
<tr>
<td>Infant and child mortality</td>
<td>Sex ratio at birth</td>
<td>Infanticide, excess mortality caused by relative neglect</td>
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<tr>
<td>Adolescent and adult mortality, including maternal mortality</td>
<td>Child sex ratio</td>
<td>Selective migration</td>
</tr>
<tr>
<td></td>
<td>Adult sex ratio</td>
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</table>

### Sex ratio measurements

- The sex ratio at birth is best measured by using birth records
- Sex ratios can be computed from decennial censuses
  - Sex ratio of recent births
  - Population below one (sex ratios by age)
- Surveys provide less reliable estimates because of the sensitivity to small samples
Demographic masculinization

- Amartya Sen spoke of "missing women" in 1990
- Missing women are now increasingly "missing girls"
- Surge in sex ratio at birth (SRB) in many Asian countries
- Rising from 105 (normal level) towards 110-130 (5 to 25% excess male births)
- Caused by sex selective abortions: prenatal sex diagnosis followed by abortion of female fetuses

### SRB in affected countries

<table>
<thead>
<tr>
<th>Country / regions</th>
<th>SRB</th>
<th>period</th>
<th>Data type</th>
</tr>
</thead>
<tbody>
<tr>
<td>East and South East Asia</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>China (Mainland)</td>
<td>118.1</td>
<td>2009 Census estimate</td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td>111.2</td>
<td>2010 Annual demographic survey</td>
<td></td>
</tr>
<tr>
<td>South Asia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>110.6</td>
<td>2006-08 Sample registration</td>
<td></td>
</tr>
<tr>
<td>Caucasus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>117.6</td>
<td>2009 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Armenia</td>
<td>115.8</td>
<td>2008 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>111.9</td>
<td>2006 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Southeast Europe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albania</td>
<td>111.5</td>
<td>2008 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Montenegro</td>
<td>111.4</td>
<td>2006-09 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Kosovo</td>
<td>112</td>
<td>2010 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Macedonia</td>
<td>109</td>
<td>2009 Birth registration</td>
<td></td>
</tr>
<tr>
<td>Rest of Europe and North America</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian or Albanian diasporas</td>
<td>107-110</td>
<td>2000-09 Special studies</td>
<td></td>
</tr>
</tbody>
</table>

Recent features

- Rise of the SRB in Viet Nam since 2004
- Growing awareness of high SRB in Caucasus since 2005, and in Southeast Europe since 2008
- Evidence on immigrant communities: UK, USA, Canada.
- Recent evidence on Greece, Norway and Italy (especially Tuscany)
Postnatal discrimination against girls

Country/region | Mortality sex ratio under five (per 100) | Excess female deaths under five per year (in thousands)
--- | --- | ---
Afghanistan | 98.0 | 24
Bangladesh | 102.6 | 14
China | 71.1 | 97
India | 87.9 | 271
Nepal | 93.9 | 4
Georgia | 109.7 | *
Albania | 104.5 | *
Armenia | 107.9 | *
Azerbaijan | 104.9 | *
Europe | 125.0 | *

- Mortality sex ratios under five computed as ratios of male mortality rates to female rates.
- Annual excess female deaths (in thousands) computed by using 120 as normal mortality sex ratio for 2005-10.
- *: negligible number.

Gender gap in 2010

- Objectives: to estimate missing women in 2010
- Methodology:
  - Compute sex ratios by age in "normal" countries
  - Infer from these sex ratios the expected number of women in countries with sex discrimination
  - Compute the number of missing women by age by comparing with observed women
- Data source: 2010 World population estimates (UN Population Division)

Women missing in 2010

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Gender gap Total (000s)</th>
<th>Gender gap 0-19 yrs Total (000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>860</td>
<td>265</td>
</tr>
<tr>
<td>Albania</td>
<td>45</td>
<td>21</td>
</tr>
<tr>
<td>Armenia</td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>*</td>
<td>111</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2,082</td>
<td>416</td>
</tr>
<tr>
<td>China</td>
<td>67,589</td>
<td>25,112</td>
</tr>
<tr>
<td>Georgia</td>
<td>*</td>
<td>24</td>
</tr>
<tr>
<td>India</td>
<td>42,687</td>
<td>12,618</td>
</tr>
<tr>
<td>Montenegro</td>
<td>*</td>
<td>3</td>
</tr>
<tr>
<td>Nepal</td>
<td>*</td>
<td>125</td>
</tr>
<tr>
<td>Pakistan</td>
<td>2,833</td>
<td>206</td>
</tr>
<tr>
<td>Rep. of Korea</td>
<td>608</td>
<td>336</td>
</tr>
<tr>
<td>Singapore</td>
<td>124</td>
<td>31</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>*</td>
<td>139</td>
</tr>
<tr>
<td>Total</td>
<td>116,829</td>
<td>39,467</td>
</tr>
</tbody>
</table>

Numbers given in thousands
Percentages of the total corresponding female population in each country

Variations and the context for discrimination against girls

- The sex ratio at birth is never uniform across parities, social classes, regions, or ethnic groups
- Differentials help to understand who practices sex selection, and why, how or when they do it
- Factors combine demographic features and socioeconomic characteristics
**Sources of variation in sex ratios**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impact on sex ratio at birth</th>
<th>Country</th>
</tr>
</thead>
</table>
| Birth order, gender composition | • Sex ratio increases rapidly with higher birth order  
• Sex ratio highest among final births  
• Sex ratio highest in families with no previous son | All countries, diasporas               |
| Rural/urban       | • Moderate variations, with opposite trends across countries                                 | All countries                          |
| Region            | • Geography usually the strongest source of sex ratio variations within the country           | All countries                          |
| Ethnicity         | • Ethnic groups exhibit very distinct sex ratio levels  
• Most minority groups have lower sex ratio levels | Viet Nam, China, India, Singapore       |
| Religion          | • Hindus, Sikhs, Buddhists, and Jains have comparatively higher sex ratio levels than Muslims or Christians | India, South Korea                    |
| Socioeconomic status | • Lower sex ratio among the poorest households  
• Highest among the richer sections and among the better educated  
• Decreases among the most affluent in China  
• Lower sex ratio among women with social insurance in China | China, India, Viet Nam                 |

The three preconditions of modern sex selection: ability, readiness and low fertility pressure

- Old discriminatory technology: infanticide, neglect of girls, rituals for male births, etc.
- Contraception linked to gender composition
- Emergence of modern prenatal diagnosis from the 1980s, combined with abortion facilities
  - Better healthcare infrastructures and greater accessibility
  - Lower cost of prenatal technology
  - Improved reproductive health and prenatal care
  - Higher living standards
“It is necessary”: the “squeeze” effect of declining fertility

- Fertility decline occurred throughout most of the developing world
- Governments introduced everywhere policies to encourage or to impose birth control
- It became more difficult to simply have one more pregnancy to get a son
- Lower fertility means higher risks of not having a son

“It is worthwhile”: local contexts of son preference

- Sociocultural, economic, demographic, political and spiritual reasons make sons more valuable than daughters
- Reasons vary, but the common context is the presence of “patriarchal” kinship systems
  - Patrilineal descent groups (clans, patrilineage etc.)
  - Patrilocal systems (residence with or close to the husband’s parents)
  - Sons extending material and social support to their parents

Prenatal sex selection: families, governments and markets

- Families: Patriarchal son preference
- Governments: Birth control policies
- Markets: Sex selection technology

Rising sex ratios at birth

- Economic development
- New technologies
- Contraception
- 1. Son preference
- Patriarchal family
- 2. Fertility decline
- 3. Prenatal sex determination
- Abortion
- Private health sector
Government’s leverage on intermediate variables of sex selection

- Low fertility pressure:
  - Relaxation of drastic birth planning regulations
- Technology:
  - Regulating access to sex determination and emerging technologies
  - Controlling illegal abortions
- Son preference:
  - Subsidizing girls: conditional cash transfers and affirmative action
  - Promoting gender equity: campaigns and laws on family, inheritance, employment etc.

Pathway to a gradual reduction of sex selection

Son preference
- Son preference diminishes under the impact of the growing market irrelevance of patriarchy, new schemes supporting girls, gender equity laws, and the marriage squeeze crisis

The fertility "squeeze"
- The impact of the fertility "squeeze" (risk of not having a son) continues to increase, except in areas where drastic birth control regulations are relaxed. Yet fertility doesn’t rebound.

The supply factor (technology)
- Access to discriminatory technology continues to improve thanks to new sex selection technology unless governments can effectively ban sex determination testing

Sex ratio at birth
- The downturn in birth masculinity trends results from the rapid decline of son preference as a result of market-driven social changes and further support to gender equity by the State