Status Externalities and Low Birth Rates in Korea
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Summary
- Fertility is very low in Korea. Why?
- Government concerned about low birth rate. What, if anything, should be done about it?
- Fertility-income relationship is positive in Korea – in contrast to other countries.
- Hypothesis: Status externality important in Korea. Responsible both for low birth rates and positive fertility-income relationship.
- Explore what this implies for policy.

Fertility rate in Korea very low

<table>
<thead>
<tr>
<th>Country</th>
<th>TFR, 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Korea</td>
<td>1.17</td>
</tr>
<tr>
<td>Germany</td>
<td>1.50</td>
</tr>
<tr>
<td>United States</td>
<td>1.80</td>
</tr>
<tr>
<td>East Asia and Pacific</td>
<td>1.85</td>
</tr>
<tr>
<td>High income countries</td>
<td>1.68</td>
</tr>
<tr>
<td>World</td>
<td>2.44</td>
</tr>
</tbody>
</table>

Declining fertility in Korea

Cross-sectional fertility-income relationship in Korea

- Fertility is positively related to family income, especially in recent cohorts.
- The profile has shifted down in recent cohorts: falling fertility.
- The profile has become steeper in recent cohorts.

Contrast to the US

Model Economy
- We build on the quality-quantity model of De la Croix and Doepke (2003).
  - Endogenous fertility (discrete) & Intergenerational human capital investment
  - Status externalities: utility function defined as
    \[ U(c_t, c_{t+1}, l, h_t|h) \]
    where \( h \): average human capital to which parents compare their children.
  - Family heterogeneity
    - \( h \): human capital of parents (endogenous)
    - \( \kappa \): human capital formation productivity (exogenous)
    \( \log \kappa \sim N(\mu_\kappa, \sigma_\kappa^2) \)
- Production: Cobb-Douglas
  \[ Y = AK^nL^{1-n} \]
- General equilibrium:
  \[ L = \mu_L \int \left( h \times l(h, \kappa) \right) dF(h) dF(\kappa) \]
  \[ K = \mu_K \int \left( l(h, \kappa) dF(h) dF(\kappa) \right) \]
- Stationary equilibrium: stationary distribution of human capital \( F(h) \).

Household’s problem:
\[ V(h, \kappa) = \max_{G_t, c_t, c_{t+1}} \left\{ \log \left( \frac{c_t}{h_t} \right) + \beta \log \left( \frac{c_{t+1}}{h_t} \right) + B \log(1 - l - \lambda \kappa) + \phi(\kappa)(h' - \bar{h})' \right\} \]
where \( c_t + s + p_o x_t \leq \psi h_t, c_0 = (1 + r)s, h' = \kappa (h + x^\alpha h^\beta), l \in [0, 1 - \lambda \kappa] \)
\( \alpha = 0 \), strength of externality, \( \kappa(\kappa) \): household equivalence scale

Calibration, Results & Policy Experiments

Model matches positive fertility-income relationship.
- Without externality:
  - Fertility rate higher (2.34 vs 1.84), especially among lower income parents.
  - Income elasticity of fertility falls (from 0.09 to −0.02).
  - Average investment per child as share of income falls from 6.7% to 5.7%.

Huge demand for private education in Korea

Private education survey: spending on Hagwon (crum school), private/group tutoring, internet/online tutoring.
- Average monthly spending per school-aged child around 240 USD (almost 10% of net income).
- Participation rate (any after-school programs) above 70%.
- Average time spent in private education by students around 4-8 hours per week.

The Hypothesis
- Status concerns seem particularly important in Korea.
- Parents appear obsessed about their children’s future status in society.
  \( \Rightarrow \) makes parents over-invest into education \( \Rightarrow \) makes children particularly expensive \( \Rightarrow \) reduces fertility.
- Especially poorer parents cannot afford (desired) education and rather have fewer kids.
- Lowers aggregate fertility rate; but also affects slope of fertility-income relationship.

Forced to decide between giving her daughter siblings or an expensive education, Hong Sung-ok saw little choice. “I can’t afford not to send my child to privation tuition, because everyone else does,” says the 47-year-old insurance saleswoman. “I spend more than half my income on tutors and childcare expenses - it’s really expensive… That’s why I decided to have only one child.” (Financial Times, Jan 2, 2013)
- Goal of this project: investigate this idea in a quantitative model.

Inefficiency
- The presence of externality leads to "too low" fertility and "too high" education simultaneously.
- Room for government intervention to correct inefficiency
  - e.g., tax on private education investment: \( (1 + \tau)_n \)