The Quantitative Role of Child Care for Fertility and Female Labor Force Participation

Alexander Bick
Eva Garcia Moran
May 2010
Motivation

- Increasing provision of child care reduces disincentives for female participation in the labor market
- Cross country evidence suggests that this is so

**OECD Countries**: Children aged 0 – 2
However, this does not remain true when looking at older children.

**OECD Countries**: Children aged 3 – 5
Motivation

- Paid care is heavily used by non working mothers
- High fraction of working mothers do not use paid child care
Assess quantitatively the role of childcare on maternal labor force participation and fertility choices

Structural life cycle model with endogenous fertility, labor supply and child care choices

Calibrate the model to West Germany
Related literature

- Quantitative importance of childcare using structural models in Germany
- Garcia-Moran (2010) which polices promote, maternal employment, fertility and good measures of children well being?
Model
Environment

- Concentrate on females
- Women live for 6 periods
- One period is 3 years
- At the beginning of life a woman is matched exogenously to a man
- People have different productivities \( \{\epsilon_t, \epsilon^*_t\} \)
- Women decide on:
  - how many children to have, \( n \)
  - how much to work, \( l_t \)
  - how much time to be with children \( m_t \)
  - childcare \( cc_t \)
- Income will depend on productivity and for women also on experience \( x_t \)
Child care can be:
- Subsidized
- Non-subsidized
- Non-paid

There is limited slots for subsidized care ($a_t$). Women get this care randomly.

Maternal leave: 3 years of leave allowed
Model

Woman’s problem

- Woman’s per period utility
  \[ u_t = u_1(c_t) + u_2(1 - l_t - m_t) + u_3(n) + Q_t \]

- Budget constrain
  \[ c_t = \tau(y(l, x, \epsilon), y^*(t, \epsilon^*)) - f_{cc}(n, t, cc_s, cc_{ns}, y, y^*) + T(n, t, l_t) \]

- Children’s quality \( Q_t \)
  \[ Q_t = \ln \{g(m) - h(1 - m_t - c_{s,t} - c_{ns,t}) - \zeta\} \]
Model

Time line

<table>
<thead>
<tr>
<th>States</th>
<th>Pre-school</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>$z_1^\dagger$</td>
<td>$z_1, n, z_2, n, a_1$</td>
<td>$z_3, n$</td>
</tr>
<tr>
<td></td>
<td>$a_2$</td>
<td>$z_4, n$</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>$z_5, n$</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>$z_6, n$</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Choices

$cc, cc, l, m, l, m, l, m, l, m$
Model

- First period: Two stages
  - 1st: Productivities drawn, decide on \( n \) to maximize
    \[
    \max_n E_{a_1} V (1, \epsilon_1, \epsilon_1^*, x_1, n, a_1)
    \]
  - 2nd: \( a_t \) is determined, \( l, m, cc_s, cc_{ns} \) are chosen to maximize
    \[
    V (1, \epsilon_1, \epsilon_1^*, x_1, n, a_1) = \max u_t + \beta E_{\epsilon, \epsilon^*, a_2} V (2, \epsilon_2, \epsilon_2^*, x_2, n, a_2)
    \]
Second period is similar but $n$ is already known
Third period children go to mandatory school and $cc$ does not have to be chosen
Other periods similar to 3rd
**Simulation**

<table>
<thead>
<tr>
<th>Target</th>
<th>Data</th>
<th>Model</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fertility</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraction of females</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with out children</td>
<td>10.7</td>
<td>10.1</td>
<td>0.6</td>
</tr>
<tr>
<td>with one child</td>
<td>21.0</td>
<td>20.0</td>
<td>1.1</td>
</tr>
<tr>
<td>with two children</td>
<td>50.4</td>
<td>51.2</td>
<td>−0.8</td>
</tr>
<tr>
<td><strong>Labor Force Participation Rate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t = 1$</td>
<td>26.5</td>
<td>26.2</td>
<td>0.3</td>
</tr>
<tr>
<td>$t = 2$</td>
<td>53.2</td>
<td>53.6</td>
<td>−0.4</td>
</tr>
<tr>
<td>$t = 6$</td>
<td>60.0</td>
<td>56.8</td>
<td>3.1</td>
</tr>
<tr>
<td>$t = 1$: $\Delta_{{n-1}-{n-2}}$</td>
<td>10.9</td>
<td>11.5</td>
<td>−0.6</td>
</tr>
<tr>
<td>Full-time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t = 1$</td>
<td>4.7</td>
<td>5.1</td>
<td>−0.5</td>
</tr>
<tr>
<td>$t = 2$</td>
<td>8.4</td>
<td>8.7</td>
<td>−0.3</td>
</tr>
<tr>
<td>$t = 6$</td>
<td>19.7</td>
<td>16.5</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Child Care Enrollment Rate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t = 1$</td>
<td>5.6</td>
<td>5.1</td>
<td>0.5</td>
</tr>
<tr>
<td>$t = 2$</td>
<td>83.7</td>
<td>81.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Full-time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t = 2$</td>
<td>11.6</td>
<td>12.9</td>
<td>−1.3</td>
</tr>
</tbody>
</table>
Experiments

- Increase available subsidized child care
  - Rationing conditional on working
  - No rationing
- Small effect on women labour force participation
- Higher fertility rate with rationing
- Lower fertility rate with no rationing
Experiments

- Increase in transfers
  - Higher maternity leave transfer
  - Child benefits
- Decrease mothers employment when children small. Increases afterwards
- Fertility increases
Conclusions

- Money matters for fertility
- Experiments have no effect on female labor force participation