Impacts of Factory Jobs on Fertility: Experimental Evidence from Ethiopia

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Motivation: High fertility rates in Africa

Source: UN, Population Division
Motivation: High fertility rates in Africa

What is the problem?

High population growth

Source: UN, 2017 Revision of World Population Prospects.
Motivation: High fertility rates in Africa

What is the problem?

High population growth

Unwanted high fertility

Source: UN, 2017 Revision of World Population Prospects.

Source: World Bank, WDI
Solution?

Wage employment for women

- Women who work outside the home has fewer children(?)
- Women who work outside the home is more empowered(?)
Fertility and female labor force participation, 1960 to 2015

The labor force participation rate corresponds to the proportion of the population ages 15 and older that is economically active. Fertility corresponds to the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with the age-specific fertility rates of the specific year.
Does female labor force participation causally affect fertility rates?

Theoretically and empirically there is an inverse relationship between female labor force participation and fertility rates.
Does female labor force participation causally affect fertility rates?

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The endogeneity problem
Does female labor force participation causally affect fertility rates?

Theoretically and empirically there is an inverse relationship between female labor force participation and fertility rates.

The endogeneity problem

- Jobs $\rightarrow$ Fertility?
Does female labor force participation causally affect fertility rates?

Theoretically and empirically, there is an inverse relationship between female labor force participation and fertility rates.

**The endogeneity problem**

- Jobs $\rightarrow$ Fertility?
- Jobs $\Leftarrow$ Fertility?
Does female labor force participation causally affect fertility rates?

Theoretically and empirically there is an inverse relationship between female labor force participation and fertility rates.

**The endogeneity problem**

- Jobs $\rightarrow$ Fertility?
- Jobs $\leftarrow$ Fertility?
- Jobs $\leftrightarrow$ Fertility?
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The endogeneity problem

- Jobs $\rightarrow$ Fertility?
- Jobs $\leftarrow$ Fertility?
- Jobs $\leftrightarrow$ Fertility?
- Jobs $\leftarrow / \rightarrow$ Fertility?
Does female labor force participation causally affect fertility rates?

Theoretically and empirically there is an inverse relationship between female labor force participation and fertility rates.

**The endogeneity problem**

- Jobs $\rightarrow$ Fertility?
- Jobs $\leftarrow$ Fertility?
- Jobs $\leftrightarrow$ Fertility?
- Jobs $\leftarrow / \rightarrow$ Fertility?

**Selection problem**
Does female labor force participation causally affect fertility rates?

Theoretically and empirically there is an inverse relationship between female labor force participation and fertility rates.

The endogeneity problem

- Jobs $\rightarrow$ Fertility?
- Jobs $\leftarrow$ Fertility?
- Jobs $\leftrightarrow$ Fertility?
- Jobs $\leftarrow / \rightarrow$ Fertility?

Selection problem

- Workers are different from non-workers on unobservables
Female labor force participation and fertility

- **Income effect**

- **Substitution effect**

- **Empowerment effect**
Our contribution

- First causal investigation of jobs on married women’s fertility choices by use of randomized controlled trial.
Job randomization

- 21 factories in five regions
- Job offer randomization to eligible married women
- Baseline + three follow-up surveys
- Sample size: 1872 (846)
Manufacturing
Employment and income

Did you start working in factory X?

Total income the last six months
Employment and fertility outcomes
Employment and fertility outcomes

Are you pregnant now or have you been pregnant since we last interviewed you?

- Control group
- Treatment group
Employment and fertility outcomes

![Bar chart](chart1.png)

Are you pregnant now or have you been pregnant since we last interviewed you?

- Control group: 10%
- Treatment group: 5%

![Bar chart](chart2.png)

If you could choose exactly the number of children to have in your whole life, how many would that be?

- Control group: 3.5
- Treatment group: 4.5

Note: The figures are illustrative and may not reflect actual data.
Employment and fertility outcomes

- Are you pregnant now or have you been pregnant since we last interviewed you?
- If you could choose exactly the number of children to have in your whole life, how many would that be?
- Do you use any method to avoid pregnancy?
## Employment and fertility outcomes

### Table 1: Impact of the job offer on fertility outcomes

<table>
<thead>
<tr>
<th></th>
<th>Pregnant</th>
<th>Preferred fertility</th>
<th>Contraceptive use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>IV</td>
<td>OLS</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.032</td>
<td>-0.267***</td>
<td>0.181</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(0.081)</td>
<td>(0.134)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Block</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>846</td>
<td>846</td>
<td>843</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.046</td>
<td>-</td>
<td>0.247</td>
</tr>
<tr>
<td>Control mean</td>
<td>0.12</td>
<td>0.14</td>
<td>3.8</td>
</tr>
</tbody>
</table>

**First stage results:**

|                | OLS      | IV                  | OLS               | IV                |
|----------------|----------|---------------------|-------------------|
| Any wage job the last 6 months | 0.304*** | 0.301***            | 0.295***          |
| Robust standard error          | (0.036)  | (0.037)             | (0.039)           |
| F statistic for IV in first stage | 3 969 | 4 011               | 727               |

Baseline controls includes: age, religion, education level, total hh-income the last six months, number of hh-members, and a dummy whether the respondent had any wage job the last six months (in OLS regressions). Robust standard errors in parenthesis. ***p > 0.001,** p > 0.05,* p > 0.01.
Mechanisms

Job

Substitution channel

Income channel

Empowerment channel

- +

Quality

- —

Quantity
Employment and decision-making power

Who in your household usually has the final say about the following decisions?

1. Whether to send or not send children to school
2. What to do if a child falls sick
3. What to do if the respondent falls sick
4. Whether to have children or to have more children
5. Which family planning methods to use
6. Whether or not you should earn money outside the house
7. Whether you can visit your family or relatives
8. The use of the wife’s earned income
9. The use of the man’s /husband’s earned income
10. Purchase of small daily food purchases
11. Purchase of bulk or expensive food items
12. Large purchases of items like furniture, cattle, TV, or other assets
13. Purchase of children’s clothing and shoes
14. Weather to open bank account or borrow money
15. Whether to start a new business
Employment and decision-making power

[Bar charts showing decision-making index 1 and decision-making index 2 for control group and treatment group.]

- Decision-making index 1
  - Control group: 0.7
  - Treatment group: 0.7

- Decision-making index 2
  - Control group: 0.8
  - Treatment group: 0.8
## Employment and decision-making power

### Table 2: Impact of the job offer on household decision-making power

<table>
<thead>
<tr>
<th></th>
<th>Decision-making index 1</th>
<th>Decision-making index 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS IV OLS IV</td>
<td>OLS IV OLS IV</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.017 0.110 (0.022) 0.077</td>
<td>-0.042 0.084 (0.030) 0.115</td>
</tr>
<tr>
<td>Controls Block</td>
<td>Yes Yes Yes Yes</td>
<td>Yes Yes Yes Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>846 846 585 585</td>
<td>585 585</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.145 0.101 0.165 0.134</td>
<td>0.69 0.68 0.71 0.71</td>
</tr>
<tr>
<td>Control mean</td>
<td>0.69 0.68 0.71 0.71</td>
<td>0.69 0.68 0.71 0.71</td>
</tr>
</tbody>
</table>

**First stage results:**

- Any wage job the last 6 months: 0.304*** 0.288***
- Robust standard error: (0.036) (0.047)
- F statistic for IV in first stage: 3 979 20 739

Decision-making index 1 includes all 15 household decisions, while Decision-making index 2 includes only decisions regarding family planning and child care. The last two columns only include households with at least one child. Baseline controls includes: age, religion, education level, total hh-income the last six months, number of hh-members, and a dummy whether the respondent had any wage job the last six months (in OLS regressions). Robust standard errors in parenthesis. ***p > 0.001,** p > 0.05,* p > 0.01.
## Channels: Income or Substitution?

### Table 3: Impact of the job offer on income and substitution channels

<table>
<thead>
<tr>
<th></th>
<th>Income channel</th>
<th>Substitution channel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>IV</td>
</tr>
<tr>
<td>Treatment</td>
<td>0.203***</td>
<td>2.229***</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.269)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Block</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>846</td>
<td>846</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.184</td>
<td>-</td>
</tr>
</tbody>
</table>

Income channel is defined as a dummy equal to 1 if respondent earned more equal to or more than the median wage the last six months. The substitution channel is defined as a dummy equal to 1 if the respondent wish to return to work three months or less after birth (hypothetically). Baseline controls includes: age, religion, education level, total hh-income the last six months, number of hh-members, and a dummy whether the respondent had any wage job the last six months (in OLS regressions). Robust standard errors in parenthesis. ***p > 0.001, **p > 0.05, *p > 0.01.
Preliminary conclusions

- Jobs seems to decrease fertility (in the short run) and decrease preferred lifetime fertility.
- No change in contraceptive use.
- The impacts of a job on fertility is most probably an income effect, and not a substitution or empowerment effect.
## Employment and income

### Table 4: Impact of the job offer on employment and income

<table>
<thead>
<tr>
<th></th>
<th>Employment in factory</th>
<th>Total income last 6 months (ETB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>0.444***</td>
<td>1,018***</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(297.4)</td>
</tr>
<tr>
<td>Controls</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Block</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Observations</td>
<td>846</td>
<td>846</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.375</td>
<td>0.089</td>
</tr>
<tr>
<td>Control mean</td>
<td>0.12</td>
<td>3,052</td>
</tr>
</tbody>
</table>

Baseline controls includes: age, religion, education level, total hh-income the last six months, number of hh-members, and a dummy whether the respondent had any wage job the last six months. Robust standard errors in parenthesis. ***p > 0.001, **p > 0.05, *p > 0.01.
Table 5: Baseline summary means, standard deviations, and tests of randomization balance

<table>
<thead>
<tr>
<th>Baseline (n=846)</th>
<th>Control</th>
<th>Treatment</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>25.6</td>
<td>25.9</td>
<td>-0.2</td>
</tr>
<tr>
<td></td>
<td>(6.7)</td>
<td>(7.3)</td>
<td>[0.631]</td>
</tr>
<tr>
<td>Years of schooling completed</td>
<td>8.6</td>
<td>8.8</td>
<td>-0.2</td>
</tr>
<tr>
<td></td>
<td>(3.6)</td>
<td>(3.4)</td>
<td>[0.461]</td>
</tr>
<tr>
<td>Muslim</td>
<td>0.23</td>
<td>0.17</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(0.42)</td>
<td>(0.38)</td>
<td>[0.031]</td>
</tr>
<tr>
<td>Ethiopian Orthodox</td>
<td>0.67</td>
<td>0.65</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.48)</td>
<td>(0.48)</td>
<td>[0.808]</td>
</tr>
<tr>
<td>Have ever given birth</td>
<td>0.70</td>
<td>0.69</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>(0.46)</td>
<td>(0.46)</td>
<td>[0.687]</td>
</tr>
<tr>
<td>Number of children</td>
<td>1.38</td>
<td>1.28</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(1.45)</td>
<td>(1.35)</td>
<td>[0.311]</td>
</tr>
<tr>
<td>Any wage job the last six months</td>
<td>0.19</td>
<td>0.26</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>(0.39)</td>
<td>(0.44)</td>
<td>[0.013]</td>
</tr>
<tr>
<td>Earnings the last six months (ETB)</td>
<td>2 695</td>
<td>2 403</td>
<td>292</td>
</tr>
<tr>
<td></td>
<td>(5 234)</td>
<td>(4 111)</td>
<td>[0.365]</td>
</tr>
<tr>
<td>Total HH-income the last six months (ETB)</td>
<td>18 492</td>
<td>18 326</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>(13 281)</td>
<td>(13 092)</td>
<td>[0.856]</td>
</tr>
<tr>
<td>Total household members</td>
<td>3.4</td>
<td>3.4</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>(1.4)</td>
<td>(1.4)</td>
<td>[0.674]</td>
</tr>
</tbody>
</table>

Standard deviations in parenthesis. Two-tailed p-values in square brackets.
Difference between actual and wanted fertility
Heterogeneity analysis

Age

- Are you pregnant now or have you been pregnant since we last interviewed you?
- Do you use any method to avoid pregnancy?
- If you could choose exactly the number of children to have in your whole life, how many would that be?
- Decision-making index
Heterogeneity analysis

Religion

- Are you pregnant now or have you been pregnant since we last interviewed you?
- Do you use any method to avoid pregnancy?
- If you could choose exactly the number of children to have in your whole life, how many would that be?
- Decision-making index
Heterogeneity analysis

Education level

- Are you pregnant now or have you been pregnant since we last interviewed you?
- Do you use any method to avoid pregnancy?
- If you could choose exactly the number of children to have in your whole life, how many would that be?
- Decision-making index

Comparisons are made between Control and Treatment groups for different education levels and age groups.
Heterogeneity analysis

No child at baseline