Reassessing the Relationship between Fertility and Female Labor Supply

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Abstract

This research provides new evidence on the relationship between **fertility and female labor supply** in a **developing country**. An instrumental variable approach indicates that an exogenous increase from two to more than two children is associated with an increase in female labor supply on the intensive margin for the group of compliers. This "local average treatment effect" seems not to be generalizable.

Research Questions

- Does the well-established neg. relationship between fertility and female labor supply also hold in **less developed countries**?
- What kind of **heterogeneities** can be observed?
- Can local treatment effects provide suggestive evidence for the female population in general?

Motivation

- Simple theoretical model based on quantity-quality model (Becker & Lewis, JPE 1973) and model of home production (Gronau, JPE 1977): Effect of exogenous increase in number of children on parent's labor supply subject to **opposing income and substitution effect**
- In developing countries, **budgetary consequences of childbearing more severe** due to low av. household income levels and absence of compensating child transfers
- Treatment effect likely to vary substantially in population due to high degree of heterogeneity in labor arrangements, inequality in household income, and availability of childcare
  → **Heterogenous treatment effect framework**, analysis across dimensions of heterogeneity

Data

The analysis uses **Mexican** census data from 2010

- Observations on 500,000 mothers aged between 18 and 35 with at least 2 children in household
- Outcome of interest: Hours worked per week at time of census in **formal and informal employment**

Estimation Strategy

IV approach exploiting parental preferences for mixed-sex siblings (Angrist & Evans, AER 1998) in order to instrument for increase in family size from 2 to 3 and more children.

Identification assumptions:

Y_i = Hours worked per week,
$D_i = 1\{\text{number of children} > 2\}$
$Z_i = 1\{\text{Sex } 1^{st} \text{ child} = \text{Sex } 2^{nd} \text{ child}\}$

1. Independence: $Z_i \perp\!\!\!\perp \{Y_i(D_{1i}, 1), Y_i(D_{0i}, 0), D_{1i}, D_{0i}\}|X_i$
2. **Exclusion**: $Y_i(d, 0) = Y_i(d, 1) = Y_{di}$ for $d \in \{0, 1\}$
3. Existence of Compliers: $E[D_{1i} - D_{0i}] \neq 0$
4. **Monotonicity**: $D_{1i} \geq D_{0i}$ for all $i \in N$, or *vice versa*
5. Common support: $Supp(X_i|Z_i = 1) = Supp(X_i|Z_i = 0)$

Instrument validity I

Instrument validity in heterogenous treatment effect models by testing implications of identification assumptions (Huber & Mellace, REStat 2015)
→ H_0 cannot be rejected in given sample

Monotonicity
Having mixed-sex siblings does affect fertility only in one direction

- Fails if there are mothers with preferences for at least 2 children of the same sex and thereby chose to have third child if first children have different sexes
- No data on fertility preferences in Mexico in order to study this specific type of preferences

Instrument validity II

Exclusion restriction
The absence of systematic effects of first-born children's sex composition on labor supply other than through fertility is far from being undisputed. However, in the context of Mexico:

- Extreme preferences for male offspring absent in Mexico (Cruces & Galiani, LE 2007)
- No significant differences in economies of scale across households with different sex composition of two first-born children
- Household spending on sex-specific child goods very low (OECD Stat)

Main Results

1. Research **challenges generalizability of findings for developed countries**: Children might not only restrict the opportunity of women to participate in the labor market but as well create an incentive to increase employment
2. **Effect specific to parity** and to **small subpopulation of women** whose fertility respond to instrument

Results

Figure 1: Relationship between hours worked and fertility

Dependent variable: Hours worked per week			
	OLS	TSLS	TSLS
Instrument		*samesex*	*twoboys, twogirls*
I. Model without controls			
More than 2 children	-2.431***	5.308***	
	(0.076)	(1.897)	
Observations	285,177	285,177	285,177
II. Model with controls			
More than 2 children	-2.784***	5.238***	5.808***
	(0.084)	(1.780)	(1.762)
			[0.042]
Observations	285,177	285,177	285,177
III. Almost saturated model			
More than 2 children	-2.190***	3.196*	3.375*
	(0.081)	(1.986)	(1.982)
			[0.231]
Observations	256,726	256,726	256,726

Notes: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Control variables include age, age square, age at first birth, indicator of sex of first and second child, indicator whether member of indigenous group, and dummies for the size of the locality where the individual lives. *boy2* is excluded from the model using *twoboys* and *twogirls* as instruments, because of multicollinearity. Calculations use sample weights. The p-value for the test of overidentifying restrictions is shown in brackets.

- First stage supports **presence of mixed-sex preferences**
- **Increase in mother's weekly working time as response to increase in family size**, effect estimated to be statistically significant and stable across specifications
- Estimated distributional effects suggest heterogeneities: Effect rather at **intensive** than extensive margin
- Effect heterogeneous across husband's earnings

Beyond LATE

Figure 2: Compliance types: proportions & av. outcomes

		D_{0i} = 0	D_{0i} = 1
D_{1i}	0	[never-taker] $\hat{\phi}_n = 0.555$ $E[Y_{0i}\|\widehat{never-taker}] = 12.131$	[defier] $\hat{\phi}_d = 0$
	1	[complier] $\hat{\phi}_c = 0.040$ $E[Y_{1i}\|\widehat{complier}] = 13.961$, $E[Y_{0i}\|\widehat{complier}] = 8.623$	[always-taker] $\hat{\phi}_a = 0.405$ $E[Y_{1i}\|\widehat{always-taker}] = 9.361$

Notes: This table presents the estimated proportions and estimated average outcomes for the four compliance types under the LATE assumptions in the sample of married women.

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