Sex Ratio and Timing of the First Marriage in China: Evidence from the One-and-A-Half-Children Policy

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Abstract

In this paper I estimate the causal effect of sex ratio on timing of the first marriage by exploiting exogenous variation of the "one-and-a-half-children" policy change across regions and cohorts in China. As a major relaxation of the one-child policy in China during 1980s, the 1.5-children policy allowed rural residents to have a second child only if the first child is a girl. Due to stronger son preference at higher order births, this policy increases parents' incentive to have boys rather than girls and conduct more sex-selective abortions, resulting in a male-biased sex ratio at birth in 1980s and an excess supply of males in marriage market in 2000s. From a DiD approach with mixture proportional hazard models, I find that the first marriage is significantly delayed with a male-biased sex ratio. The delaying effects exist for both males and females, though less significant and smaller for females. The fact that females also delay the first marriage is because they set higher reservation wage of marriage in response to more males in marriage market.

1. Introduction

- **Research question**:
  How does sex ratio (number of males to females) affect timing of the first marriage?
- **Contribution**:
  - Endogeneity of sex ratio: first to exploit exogeneous variation of "the 1.5-children policy"
  - Duration of marriage search: correct for right-censoring; duration rather than equilibrium outcomes.
- **Previous literature**:
  - Sex imbalance in China (Ebenstein, 2010; Edlund et al., 2013)
  - Sex ratio and equilibrium marital outcomes (Abramitzky et al., 2011; Angrist, 2002)

2. Fertility Policies in China

- **The One-Child Policy**
  - Implemented in 1980 in all provinces
- **The 1.5-Children Policy**
  - A major relaxation of one-child limit on rural households: 54% population
  - Allow the second birth only if the first child is a girl
  - From 1985 to 2002 in 20 out of 26 Han-populated provinces
  - Reduce financial burden and facilitate birth control
- **Policy and sex ratio**
  - The 1st birth: little change; very few abortions
  - The 2nd birth: more boys; stronger incentive to have boys
  - The 3rd or higher order birth: more boys; policy favors son preference
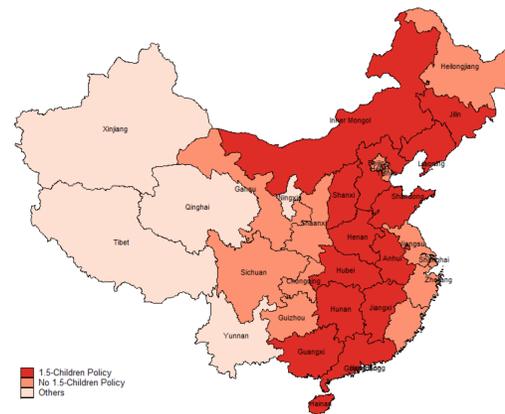 - Net effect: overall sex ratio is more male-biased

Figure 1: Map of mainland China by the "1.5-children" policy implementation (1997)

3. Data

- **Data**: China Family Panel Studies 2014; Chinese Census 2000
- **Sample**: Individuals born from 1971-1996 in 26 Han-populated provinces
- **Variables**: demographics, marriage history, sex ratio measures

4. Estimation Models

- **OLS**: Policy and sex ratio
  $SexRatio_{pt} = \rho Post\_reform_{pt} + \gamma_p + \theta_t + \nu_{pt}$
- **Reduced 2SLS**: policy and probability of marriage
  $Marriage_{ipt} = \rho Post\_reform_{pt} + X_{ipt}\beta + \gamma_p + \theta_t + \epsilon_{ipt}$
  $Post\_reform_{pt}$: 1 if born one year after policy in province p and birth year t.
  γ_p: province fixed effects
  θ_t: cohort fixed effects
- **Mixture proportional hazard**: policy and duration of marriage search
  Hazard rate: $\theta(t|X,\nu,\gamma_p) = \lambda(t,\alpha)\exp(X'_{ipt}\beta + \rho Post\_reform_{pt} + \theta_t + \gamma_p + \nu_{ipt})$
  Density function: $f(t|X,\nu,\gamma_p) = \theta(t|X,\nu,\gamma_p)\exp(-\int_0^t \theta(t|X,\nu,\gamma_p)ds)$
  Likelihood function (age in integer):
  $\sum_{i=1}^n d_i log[F(t_i-1)-F(t_i)] + (1-d_i)log[1-F(t_i)]$
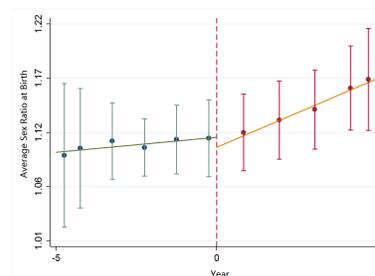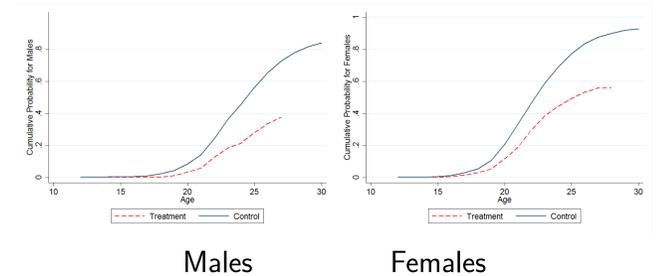
5. Baseline Results

Figure 2: Pre- and post-reform provincial sex ratio at birth

Table 1: Effects of the 1.5-children policy on provincial sex ratio

Variables	(1)	(2)	(3)
Post-reform	0.032***	0.025***	0.024**
	(0.008)	(0.008)	(0.010)
N	622	622	430
Add $t \times \gamma_p$	No	Yes	No
$t > 1979$	No	No	Yes

Figure 3: Cumulative probability of marriage by treatment

Males   Females

Table 2: Parameter coeffcients: Effects of sex ratio on timing of first marriage

Variables	(1) OLS	(2) 2SLS	(3) Reduced	(4) MPH	(5) MPH
Panel A. Males			N = 7807		
Sex ratio	-0.296***	-1.250***			-0.951***
	(0.066)	(0.342)			(0.325)
Post-reform			-0.059***		-0.342***
			(0.016)		(0.102)
Panel B. Females			N = 7689		
Sex ratio	-0.187***	-0.860**			-0.541*
	(0.059)	(0.405)			(0.300)
Post-reform			-0.032**		-0.145**
			(0.015)		(0.076)

6. Sensitivity Checks

- Robust results against using alternative measures
  - Sex ratio at matched age group
  - Post-reform interacts with share of rural population
- Lasting effects: policy effects increase over time
- Other channels of policy effects: control cohort size and dependency ratio
- Education heterogeneity: stronger effects for low-educated males and high-educated females

7. Discussion and Summary

- **Findings**:
  - The "1.5-children policy" increases sex ratio
  - A male-biased sex ratio delays the first marriage for both genders
- **Mechanisms**:
  - Education investment: little change by sex ratio
  - Males: lower offer arrival rate
  - Females: higher reservation wage of marriage, preference for hypergamy