

The role of conflict in sex discrimination: the case of missing girls

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Helsinki, 2018

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Context and background

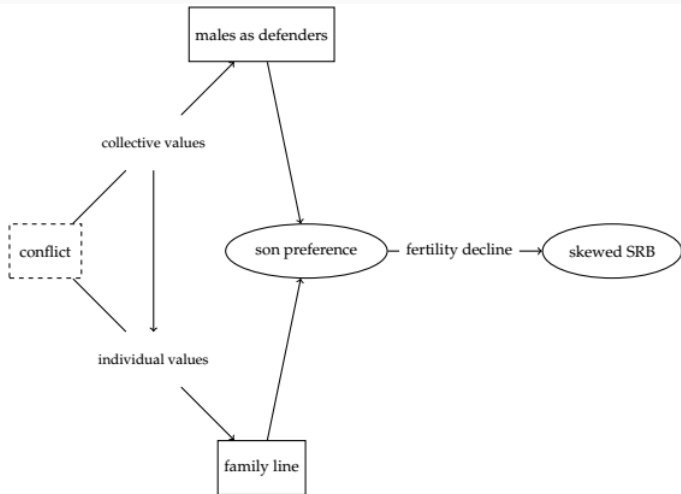
Missing girls - sex ratios at birth exceeding ~ 110

- natural sex ratios at birth: around 105 boys for 100 girls per 1000 births.
- missing women - females who would be alive if their survival was not interrupted (Sen 1990)

Literature: reasons for missing girls

- perception of males as the more productive sex (Ahn 1995).
- women's low earnings potential (Qian 2008).
- old age support from male children (Das Gupta et al 2003).
- patrilineal kinship systems (Ebenstein 2010).

Conceptual Framework



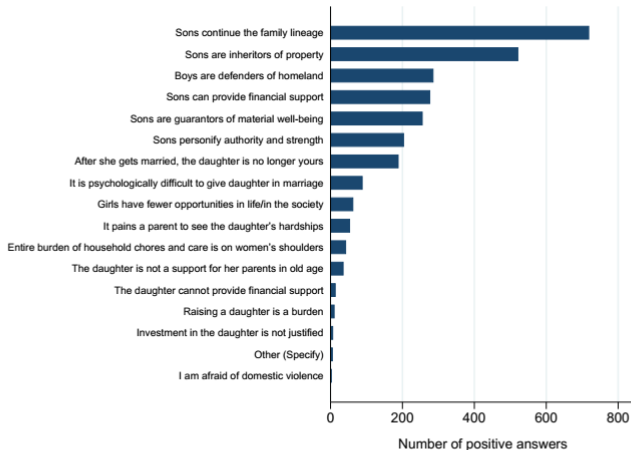
Nagorno-Karabakh conflict.



Note. Source: De Waal (2010), p.161

- nagorno karabakh war 1992-1994 war unresolved;
- many violations of ceasefire since 2008.
 - “an arms race, escalating front-line clashes, war rhetoric and a virtual breakdown in peace talks are increasing the chance armenia and azerbaijan will go back to war” (icg 2011)

Reasons for son preference: Armenia UNPFA



Note. The source is the household survey conducted in 2011 within the framework of Strengthening Sexual and Reproductive Health Services project (Abrahamyan et al., 2012). Responses are based on survey question asked in the sub-sample of women who express son preference: "Why does your family give preference to sons rather than to daughters?" More than one answer could be given.

Hypothesis 1 - Individual level

H1: Individuals highly concerned about conflict are more likely to express son preference.

- Data: caucasus barometer wave 2010; population: individuals aged 18-80
- Method: bivariate probit model at the individual level

Hypothesis 2 - Community level

H2: Exposure to threat of conflict leads to higher sex ratios (given fertility decline and access to ultrasound).

- Data: 2001 and 2011 censuses; population: 76 communities; includes all the cities and towns, and the villages with over 5000 inhabitants.
- Method: Community level difference-in-difference
- Periods: pre-ceasfire: 1987-1996 and post ceasefire: 1997-2001, 2002-2006, 2007-2011
- Treatment group: Communities closer than average to conflict center are in the treatment group, otherwise in the control group

Individual-level analysis

Armenian HH surveys, Caucasian Barometer, 2010

Variables	Definition	Mean (s.d.)		
		No Fear	Fear	All
FEAR OF CONFLICT	0-1 binary variable; equals 1 if the peace/territorial integrity are rated as key national issues	0	1	0.21 (0.41)
SON BIAS	0-1 binary variable; equals 1 if the preferred gender for a single-child family is a boy	0.51 (0.50)	0.65 (0.48)	0.54 (0.50)
MALE	0-1 binary variable; equals 1 if respondent is a male	0.49 (0.50)	0.52 (0.50)	0.50 (0.50)
AGE	Respondent's age in years	40.87 (16.42)	42.96 (15.83)	41.30 (16.32)
PARTNERED	0-1 binary variable; equals 1 if respondent has a partner	0.66 (0.47)	0.69 (0.46)	0.67 (0.47)
EDUC ≤ 10	0-1 binary variable; equals 1 if respondent has at most 10 years of education	0.43 (0.50)	0.36 (0.48)	0.42 (0.49)
EDUC 11-14	0-1 binary variable; equals 1 if respondent has between 11 and 14 years of education	0.35 (0.48)	0.38 (0.48)	0.35 (0.48)
EDUC ≥ 15	0-1 binary variable; equals 1 if respondent has 15 or more years of education	0.22 (0.42)	0.27 (0.44)	0.23 (0.42)
EMPLOYED	0-1 binary variable; equals 1 if respondent	0.38	0.43	0.39
N		1318	358	1676

Note.—Means are representative of the population. Standard deviations in parentheses.

DV - Son bias: Probit marginal effects. Baseline.

Control variables	(1)	(2)	(3)	(4)	(5)
FEAR OF CONFLICT	0.138*** (0.028)	0.140*** (0.029)	0.146*** (0.029)	0.145*** (0.029)	0.122*** (0.030)
MALE		0.108*** (0.025)	0.110*** (0.025)	0.109*** (0.026)	0.098*** (0.026)
AGE		-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.001* (0.001)
PARTNERED		0.043 (0.027)	0.043 (0.027)	0.035 (0.027)	0.010 (0.028)
EDUC ≤ 10			0.150*** (0.031)	0.151*** (0.033)	0.090** (0.035)
EDUC 11-14			0.125*** (0.032)	0.131*** (0.033)	0.105*** (0.034)
EMPLOYED				0.008 (0.028)	0.030 (0.028)
POOR STANDING				-0.021 (0.044)	-0.000 (0.044)
FAIR STANDING				0.047 (0.038)	0.058 (0.038)
OTHER URBAN					-0.015 (0.032)
RURAL					0.228*** (0.030)
Pseudo R ²	0.010	0.023	0.033	0.035	0.069
N	1723	1696	1693	1676	1676

Note.— Dependent variable is SON BIAS. Marginal effects for a discrete change of a variable from 0 to 1 for a person with FEAR OF CONFLICT=0; controls are fixed at sample means. Standard errors in parentheses. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels.

Alternative DVs

Control variables	(1)	(2)	(3)	(4)	(5)
FEAR OF CONFLICT	0.122*** (0.030)	0.067** (0.029)	0.063** (0.029)	0.044** (0.021)	0.014 (0.027)
Baseline controls included	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.069	0.031	0.037	0.028	0.044
N	1676	1641	1628	1686	1678

Note.— Dependent variable is: SON BIAS in column (1); EDUCATION IS MORE IMPORTANT FOR BOYS in column (2); MEN SHOULD HAVE MORE RIGHT TO JOBS in column (3); MEN SHOULD BE THE BREADWINNER in column (4), MEN SHOULD BE THE DECISION-MAKER in column (5). Marginal effects for a discrete change of a variable from 0 to 1 for a person with FEAR OF CONFLICT=0; controls are fixed at sample means. Standard errors in parentheses. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels.

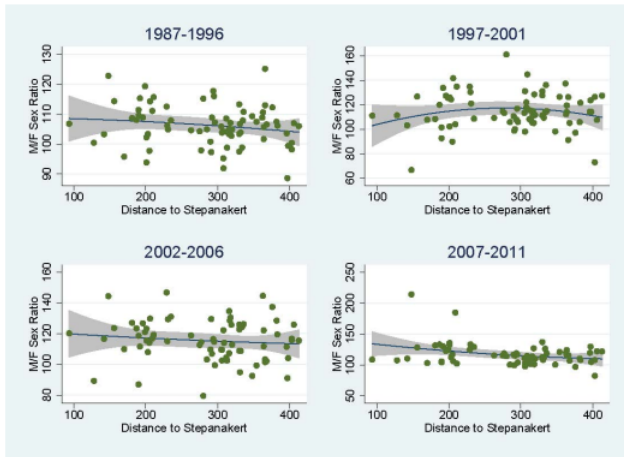
Matching estimations

	(1)	(2)	(3)
FEAR OF CONFLICT	0.093*** (0.026)	0.104** (0.046)	0.095** (0.041)
N	1387	1387	1387

Note.—Column (1) reports average treatment effects on the treated obtained by weighted least squares regressions where observations in the treatment group have a weight of 1 and observations in the control group have a positive weight obtained from matching using entropy balancing; the full set of matching covariates are included as control variables. Column (2) and column (3) report the average treatment effects from Kernel and radius matching estimators with bandwidth = 0.0009 and with standard errors calculated from bootstrapping with 50 replications; the propensity scores are calculated using the entire set of comprehensive controls from Table 7; * denotes significance at 10 percent level; ** at 5 percent level; *** at 1 percent level.

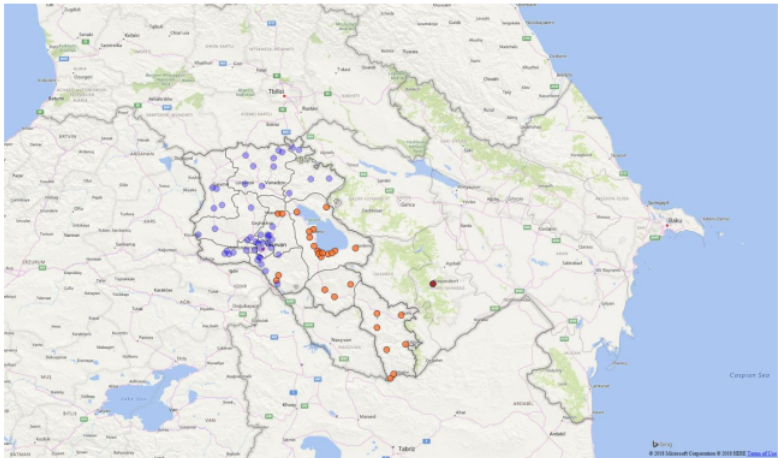
Community-level analysis

Distance to conflict and sex ratios at birth: Armenia



Note. Two-way quadratic prediction plots for the outcome variable SRB in each period. The vertical axes denote sex ratios at 0-4 ages. The horizontal axes denote distance to the capital of the conflict region - Stepanakert - for each community in the sample. The green dots denote observations for each community in the sample. The blue lines represent the fitted values with 95 percent confidence intervals.

Treatment and control communities



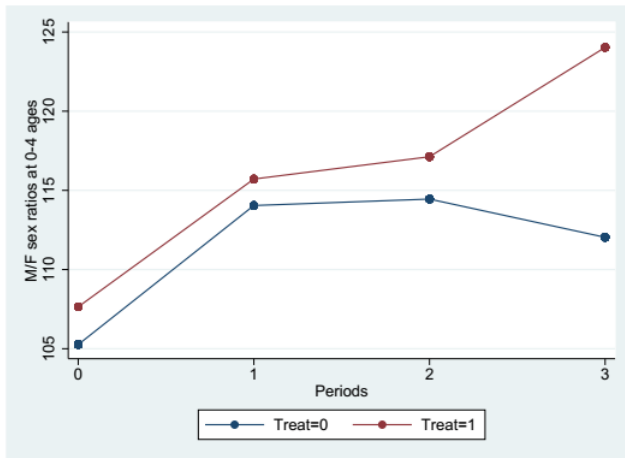
Note. Orange dots denote communities in the treatment group and purple dots denote communities in the control group. Selection into 'treatment' is based on an arbitrary cut-off point, which is the mean travel distance to the capital of Nagorno Karabakh - Stepanakert. Stepanakert is denoted with a red dot.

Descriptive statistics

	(1)
	Mean (s.d.)
<hr/> Control group <hr/>	
Male/female sex ratios at 0-4 ages (SRB) at baseline	105.26 (6.46)
Travel distance to Yerevan in km	69.90 (61.49)
Travel distance to Stepanakert in km	340.45 (36.62)
Travel difference Yerevan-Stepanakert (km)	270.55 (54.02)
Number of communities	47
<hr/> Treatment group <hr/>	
Male-female sex ratios at 0-4 ages (SRB) at baseline	107.64 (7.01)
Travel distance to Yerevan in km	153.93 (88.85)
Travel distance to Stepanakert in km	203.91 (45.96)
Travel difference Yerevan-Stepanakert (km)	49.98 (122.40)
Number of communities	29

Note.—Standard deviations in parentheses.

Parallel trends assumption



Note. A test for common trends shows the baseline period (before the ceasefire) and the first three periods after the ceasefire. The blue line indicates the SRB trend for the control group and the red line for the treatment group.

Difference-in-difference with linear time trends

Control variables	(1)	(2)	(3)	(4)
Post=1	8.782*** (2.245)	4.334 (3.044)	2.082 (4.064)	-5.188 (4.615)
Post=2	9.711*** (2.078)	7.928*** (2.111)	6.965* (3.616)	-6.944** (3.389)
Post=3	7.296*** (1.766)	12.965*** (3.695)	7.452** (3.286)	-13.307*** (1.896)
Treat=1 × Post=1	-0.711 (4.020)		3.686 (4.405)	6.453 (5.870)
Treat=1 × Post=2	-0.233 (3.383)		1.576 (4.372)	6.079 (4.075)
Treat=1 × Post=3	9.088** (4.511)		9.021** (4.325)	15.604*** (2.207)
Close to Capital =1 × Post=1		7.935** (3.714)	9.543** (4.202)	15.153*** (5.162)
Close to Capital=1 × Post=2		3.194 (3.271)	3.885 (4.241)	16.766*** (3.718)
Close to Capital=1 × Post=3		-4.204 (4.089)	-0.371 (3.651)	19.226*** (2.118)
Constant	106.035*** (0.869)	106.070*** (0.877)	106.064*** (0.858)	106.237*** (0.967)
Community time trend	No	No	No	Yes
Community FE	Yes	Yes	Yes	Yes
Number of communities	76	76	76	76
Observations	298	298	298	298

Note. The dependant variable is SRB: male over female sex ratios at 0-4 ages. Standard errors are clustered at the community level. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels.

Continuous measure of distance

Control variables	(1)	(2)	(3)	(4)	(5)
Post=1	8.511*** (2.171)	2.392 (8.505)	12.565*** (2.759)	4.538 (3.942)	11.891 (11.089)
Post=2	9.625*** (1.901)	9.928* (5.338)	11.338*** (2.471)	8.526*** (2.337)	15.287** (7.820)
Post=3	10.912*** (2.375)	25.808** (10.579)	11.689*** (2.599)	13.396*** (5.043)	35.043*** (11.306)
Post=1 × Distance to Conflict		0.021 (0.028)			0.002 (0.032)
Post=2 × Distance to Conflict		-0.001 (0.018)			-0.012 (0.022)
Post=3 × Distance to Conflict		-0.052 (0.033)			-0.071** (0.034)
Post=1 × Distance to Capital			-0.040 (0.029)		-0.039 (0.033)
Post=2 × Distance to Capital			-0.017 (0.017)		-0.022 (0.021)
Post=3 × Distance to Capital			-0.008 (0.028)		-0.038 (0.026)
Post=1 × Travel difference				-0.021 (0.016)	
Post=2 × Travel difference				-0.006 (0.010)	
Post=3 × Travel difference				0.014 (0.020)	
Constant	96.528*** (1.033)	106.042*** (0.875)	106.061*** (0.874)	106.058*** (0.878)	106.061*** (0.859)
Community FE	Yes	Yes	Yes	Yes	Yes
Number of communities	76	76	76	76	76
Observations	298	298	298	298	298

Note. The dependant variable is SRB: male over female sex ratios at 0-4 ages. Distance to Conflict is a continuous variable that measures travel distance in kilometres to the capital of Nagorno Karabakh - Stepanakert - for community *c*. Distance to Capital is a continuous variable that measures travel distance in kilometres to the capital of Armenia - Yerevan - for each community *c*. Distance to Conflict is a proxy measure for the "fear of conflict" and Distance to Capital is a

- Without outliers:
 - all post-ceasfire effects positive and stat. significant, increasing in each period
- Treatment cut-off not mean but 25th percentiles:
 - Effects in 2nd and 3rd post-ceasfire periods strongest in the third period
- Placebo: Distance not to Stepanakert but a North-West Armenian city Gumri, close to Turkey
 - Negative and small coefficient (-4.2^* for the 3rd period)

Concluding remarks

Limitations

- External validity
- Alternative conflict measures: fatalities
- Emigration to Yerevan - selection on those who stayed back
- ...

Implications

- Policies are needed to ensure gender-specific egalitarian values are in place in times of survival
 - Media and state counter-cyclical interventions
- Ban on determination of sex? - Studies show not to be effective
 - Implemented in Armenia since 2016