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The role of conflict in sex discrimination: The case of missing girls[*]

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ABSTRACT: Recent evidence shows that highly skewed sex ratios at birth are observed not only in China and India, but also for a number of countries in the Southeast Europe and South Caucasus - a region that has seen eruptions of conflicts following the collapse of communist regimes. Yet, the role of conflict has been largely overlooked in the relevant literature on "missing girls". We argue that conflict and group survival concerns can exacerbate the initial son bias and lead to relatively more male births once low fertility levels and access to ultrasound technology are given. We test our hypotheses in the context of Nagorno Karabakh conflict between Armenia and Azerbaijan. First, individual-level survey analysis from Armenia shows that relatively stronger concern over national security and territorial integrity is significantly associated with son preference. Second, difference-in-difference panel analysis of community-level census data shows that once ceasefire breaches between Armenia and Azerbaijan intensified, Armenian communities closer to the conflict region exhibited relatively higher sex ratios at birth.

JEL classification: D74, J13, J16, O15.

Keywords: discrimination, sex ratios, conflict.

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1. Introduction

The issue of "missing women" - females who would have been alive if their birth or survival had not been intentionally interrupted - has received much attention from economists since Amartya Sen's series of papers in the late 1980s. This work estimated that about 100 million women were missing, referring to the number of women who have died due to unequal access to healthcare and nutrition during childhood (Sen, 1990). The deviation from natural sex ratios at birth (around 105 boys for 100 girls per 1000 births) is viewed as a sign of revealed preference for sons in the society. The unusual sex ratios at birth in China and India have received considerable attention in the relevant literature. Son preference has been evaluated in terms of attitudes (Westoff and Rindfuss, 1974; Cleland et al., 1983; Haughton and Haughton, 1998; Kureishi and Wakabayashi, 2011), cultural norms (Li et al., 2000; Das Gupta et al., 2003; Fogarty and Feldman, 2011) and actions (Park, 1983; Sen, 1990; Coale, 1991; Klasen, 1994). Not only is such type of sex-discrimination a violation of human rights, it is also a sign for the existence of deep gender inequalities in the society (Branisa et al., 2014), which leads to limited opportunities for equal participation in the economy for half of the population (Sen, 1989). In the long run, gender bias in the economy translates into loss in economic growth and development (Lagerlöf, 2003).

Economists have argued that the costs and benefits associated with boys and girls (Ben-Porath and Welch, 1976; Rosenzweig and Schultz, 1982) and parents' perception of males as the most productive sex lead to son bias in the society (Ahn, 1995). By the same token, evidence shows that deterioration of women's household bargaining power (Klasen, 1998) and their relatively low earnings potential (Qian, 2008) endangers female survival. Similarly, Rose (1999) and Das Gupta et al. (2003) suggest that the expected old age support from adult male children is one of the factors leading to the persistence of son bias in China, India, and South Korea.

Edlund (1999), on the other hand, models son preference in the context of marriage markets in India, suggesting that high income, upper class families have stronger son preference because the probability of mating is the highest for a well-off male. In her paper, Edlund (1999) adapts a related theory from a biological literature on parental ability to vary offspring sex ratios according to their expected reproductive success (Trivers and Willard, 1973). Her model suggests that beyond economic drivers, son preference is regarded as a long-term survival strategy for populations that pass on the family lineage through a male offspring. In fact, many studies on son preference argue that patrilineal kinship system is the underlying cause for sex ratio imbalances in Asian countries, which have experienced sharp fertility decline (and economic growth) in the recent decades (Das Gupta et al., 2003; Ebenstein, 2010; Li et al., 2011; Jayachandran, 2017).

This paper contributes to the literature on son preference in terms of attitudes and actions reflected in highly skewed sex ratios at birth. We argue that a threat of conflict (perceived and real) leads to increased valuation of boys over girls because it is perceived to be the optimal strategy for group and offspring survival. Given the additional contributing factors such as fertility decline and availability of prenatal sex detection technology, the conceptual framework outlined in this paper suggests that populations highly concerned with own survival will experience larger increase in the average number of sex-selected male offspring.

We test the hypotheses derived from this framework based on the case of the unresolved conflict of Nagorno Karabakh between two countries in the South Caucasus - Armenia and Azerbaijan.

Armenia was covered in the Financial Times for its "love for boys" and highly skewed sex ratios at birth (Jack, 2017), comparable to those in China. Due to its small size, homogeneity in terms of ethnicity, religion, culture, language, equal rights (formally), low fertility levels and availability of ultrasound technology, Armenia presents an ideal case for this study. A unique data from the country at individual level for the year 2010, and a community level data for the 1987-2011 period enable us to estimate the effects of conflict at micro and meso levels. The findings show that at the individual level, fear of conflict increased the probability of having son preference by 10 percentage points, estimated using nonlinear models and matching methods. At the community level, we find that communities closer to the conflict zone, Nagorno Karabakh, had much higher sex ratios at birth once ceasefire breaches intensified. The community level estimations control for community-specfic time-invariant unobservables, community-specific time trends and access to technology, which is proxied by distance to the capital of Armenia.

The rest of the paper is structured as follows: Section 2 lays out the conceptual framework while section 3 provides the context and the background of the study. This is followed by section 4 on individual- and community-level data and descriptive statistics. Section 5 presents the empirical methods and the results. The final section concludes the paper.

2. Conceptual Framework

Our conceptual framework on conflict, survival and son preference is based on formal models of prospect theory and conflict (McDermott et al., 2008), cultural transmission of preferences (Li et al., 2000), and experimental evidence on group identity, conflict and social behavior (Weisel and Zultan, 2016).

Kahneman and Tversky (1984) have established that the set of individual choices and preferences in the domain of losses is different from that in the domain of gains (prospect theory). McDermott et al. (2008) extend this (prospect) theory to conflict situations and show how individual choices and preferences change following the changes in the political and economic environment. They focus on risk preference and argue that in the times of abundance (i.e. resources, land, food, security in survival), it is optimal for individuals to be risk averse because the added value of taking a risk is much lower compared to possible losses. However, once individuals perceive their survival to be under threat, the optimal choice for individuals is to make risky choices because the pay-offs in the case of success are higher. The choices and preferences in the McDermott et al. (2008) model are not related to survival of individuals; they are related to the *survival of offspring*, and concern life and death, reproduction and survival of the related ones. The authors note that situations where such fundamental choices need to be altered do not happen quite often, however they exist under conditions of famines, combats, and other disasters associated with political contexts. In fact, Voors et al. (2012) find that individuals who have been exposed to violent conflict are more risk-seeking and altruistic, confirming the predictions made by McDermott et al.

(2008).[1] Although McDermott et al. (2008) model only risk preferences, the theory can be applied to all types of preferences and choices that are related to group survival in general. Moreover, preference for sons over daughters is a risky behaviour from a parental perspective, however in case of success the survival of family line is perceived to be more likely especially in patrilineal societies.

Moreover, experiments show that in the presence of an external threat to a group's survival, individual preferences are derived from in-group preferences (Weisel and Zultan, 2016), which lead to a higher probability of group-conforming behaviour among the in-group individuals. In contrast, when the threat is at an individual level, the individual preferences are not overwritten by in-group preferences. Hence, one can conclude that perceived external threat to a group survival such as conflict, can lead to choices that are more group-conforming or traditional, such as son preference.

Preference for sons is embedded in patrilineal and patriarchal traditions. Using historical data, Das Gupta and Shuzhuo (1999) show that sex discrimination existed in India, China and South Korea for long periods of time because of the rigid kinship systems and the male-privileging traditions common in all three countries. However, this discrimination increased further during war, famine and fertility decline in the three countries. For example, the authors show that in China and South Korea, the largest number of girls "missing" coincides with the episodes of war and following famine and fertility decline in these regions in the mid 20th century. In the case of India, there is evidence that the large share of "missing girls" comes from Northern India (Das Gupta and Shuzhuo, 1999), which is also the region exposed to ethnic and territorial conflict both internally (e.g. Assam, Tripura, Nagaland, Manipur) and externally (e.g. Kashmir insurgency).[2] Hence, one can infer that resource scarcity and prospects of conflict that endanger group survival lead to traditional and group-conforming behaviour, namely offspring sex selection. In the case of patrilineal societies one can expect excessive preference of male-offspring over female-offspring (magnification effect).

Son preference is also transferred to new generations traditionally from parents to their offspring (vertical cultural transmission) or by the means of mass media, friends, relatives and neighbours (horizontal cultural transmission) in the spirit of Cavalli-Sforza and Feldman (1981). Li et al. (2000) model the dynamics of son preference using general theory of vertical and horizontal cultural transmission based on Cavalli-Sforza and Feldman (1981). They show that in the case of China, those regions that initially reported higher degrees of son preference were more sensitive to transmission of son-biased values from friends, relatives and mass media, compared to those regions where the reported son preference was lower. The model and findings of Li et al. (2000) suggest that once fertility is maintained at low levels, horizontal transmission of son-biased values increases the sex ratios at birth in regions where son bias is initially high, but has no affect in regions where son-bias is low initially. Thus, in the times of turbulent peace, fear of conflict induced by horizontal cultural transmission (e.g. through mass media, war rhetoric, praise of males as soldiers) is likely

[1] The alturism can be related to the preference for the survival of the related ones.

[2] Adverse effects of conflict on overall positioning of women in society has been shown in a recent study by Ramos-Toro (2018). It does not consider discrimination at birth, however.

to exacerbate son preference in communities with initially high son bias. In the presence of fertility decline and ultrasound technology, this would lead to highly skewed sex-ratios at birth.

The biological literature, on the other hand, explains the imbalances in sex ratios at birth during and after war periods based on stress hormones, coital frequency and timing. The findings of this literature are rather ambiguous[3] and the predicted consequences disappear shortly after the war.[4] In the case of such biological causes the historical equilibrium around 105 is expected to be restated in the long run, once the trigger is removed. That is, biological explanations are valid for the short run and when the sex ratios at birth cannot be manipulated. However, the data shows that in some countries these effects have extended decades after wars (Figure 1), possibly because the affected populations continue to perceive their group's survival at stake and can also manipulate the sex of their offspring. The group survival concern can be due to the one-child policy that disproportionately affected the Han population group in China (Li et al., 2011), ongoing conflicts affecting the populations in the Northern India or intense militarization in South Korea up to 1990s as well as recent conflicts and ongoing ceasefire violations in Eastern Europe and the South Caucasus[5].

[Figure 1 about here.]

We illustrate the line of our main argument in Figure 2. Based on the theories discussed above, we argue that conflict, as an external threat to group survival, has an influence on both collective (group) and individual values. Not only individual values are influenced by conflict directly, they also bear the influence of the group values. More specifically, the threat of conflict in patrilineal societies makes the values of praising males as defenders of the group more salient. This leads to valuing a boy more than a girl not only due to individual motives of continuing the family line, but also due to collective motives of ensuring the survival of the group (magnification effect). In addition, groups with initially (traditionally) high level of son bias are expected to be influenced the most by the threat of conflict. In result, traditional and collective values exacerbate the son preference and frame individuals to perceive male offspring as the optimal choice for reproduction, given the constraints.

[3]According to Kemper (1994) and James (1997), higher coital frequency in the early stages of cycle increases the probability of having a male offspring and such behaviour is common when soldiers return home. Meanwhile, James (2009) and James and Valentine (2014) suggest that changes in stress hormones can explain the fall in sex ratios observed during and shortly after a wartime. However, when these two explanations are combined - psychological stress during war and coital rates right after war - the biological effect of wartime on sex-ratios at birth becomes unclear.

[4]In the context of World War II, Bethmann and Kvasnicka (2014) argue that tight marriage markets led to an increase in the percentage of boys among the newborns in Bavarian communities in Germany during and shortly after the war. However, they do not explore the mechanisms at play. Further empirical evidence from Tajikistan during the civil war in 1992-1997, from Bosnia-Herzegovina during the Yugoslavian war in 1991-1995, and the famine in Ukraine in 1933-1936, show that these episodes were followed by increases in male-female sex ratios at birth (Adamets, 2002; Hohmann et al., 2010).These effects faded away couple of years after the war and end of the famine.

[5]It is paramount to stress that highly skewed sex ratios at birth are not observed when there is no fertility decline as families would engage in stopping behaviour once a boy is born. Since all births occur naturally, the distortions in sex-ratios would be minimal. This, however, does not mean that the underlying problem with son preference is absent.

In the presence of fertility decline, which itself adds an additional constraint over individual choices, and modern technology, the increased preference for sons is manifested in the skewed sex ratios at birth.

[Figure 2 about here.]

Thus, we test the following hypotheses to support our argument:

Hypothesis 1. Individuals highly concerned about conflict are more likely to express preference for sons.

Hypothesis 2. Exposure to threat of conflict leads to higher sex ratios at birth given the initial levels of son bias.[6]

We test our hypotheses in the context of Nagorno Karabakh conflict between Armenia and Azerbaijan. The next section describes the case in more detail.

3. Context and Background

Since 1990s sex ratios at birth have been increasing beyond the boundaries of East and South Asia. As data from the World Bank (2015) show, the three countries in the South Caucasus and also some in Southeast Europe have also seen sharp increases in sex ratios at birth. As Figure 1 reveals, the sex ratios at birth are in fact the highest in Armenia and Azerbaijan compared to the other countries in the two regions, reaching the levels observed in China.

Both of these regions have also experienced recent conflicts. Among these are the Bosnian war (1992-1995), the Albanian civil war (1997), the Kosovo war (1998-1999) in Southeast Europe. Conflicts in the South Caucasus include the Abkhazia conflict (1998), the Adjaria conflict (2004), the Kodori conflict (2006), and the Russia-Georgia conflict (2008), all in Georgia, and the conflict over the Nagorno-Karabakh Territory involving Armenia and Azerbaijan (Nagorno-Karabakh war 1992-1994), which remains unresolved to date.

In his 2017 speech at the UN General Assembly former President of Armenia, Serzh Sargsyan, stressed that Nagorno Karabakh conflict has been the "most important and intricate" challenge for Armenia since its accession to the United Nations in 1992 (Sargsyan, 2017). As media analysis and conflict resolution documents on Nagorno Karabakh point out, the threat of a conflict is a primary concern in Armenia not only at government level, but also among the population ("Yeni Nesil" Journalists Union and Yerevan Press Club, 2009; De Waal, 2010; International Crisis Group, 2011).

The territory of conflict, Nagorno-Karabakh (NK), a primarily Armenian-populated region, was assigned to Soviet Azerbaijan in the 1920s by the USSR government (The World Factbook, 2017). In 1988 Nagorno Karabakh, an autonomous region within Azerbaijan Soviet Socialist Republic (SSR) with majority Armenian population,[7] declared a union with Armenian SSR, and later in 1991, an independence from Azerbaijan SSR (De Waal, 2003).

[6] This hypothesis assumes fertility decline and access to ultrasound technology.

[7] In 1989, before the outbreak of Nagorno Karabakh war and the collapse of the Soviet Union, about 72 percent of the population in Nagorno Karabakh were Armenians and around 22 percent Azeris (USSR, 1991).

However, neither the union with Armenia in 1988, nor the independence referendum were officially recognized by Baku as the referendum was boycotted by Azerbaijani population in NK and regarded as unconstitutional by Azerbaijani government, based on Soviet constitution *de jure* in force at the time (De Waal, 2003; Freizer, 2014). The action resulted in a full blown war between Armenia and Azerbaijan over NK and led to massive displacements and ethnic killings on both sides (De Waal, 2003, 2010) The . Figure 3 presents the map of Nagorno Karabakh highlighting the territorial situation at the time of ceasefire agreement.

[Figure 3 about here.]

The ceasefire agreement in May, 1994 put a hold onto full-scale war. Yet, the clashes between Armenian and Azerbaijani troops have been increasing since 2008 in their frequency and intensity (International Crisis Group, 2011). From the Armenian and NK perspective, NK has been legally separated from Azerbaijan since December 1991 referendum and has been *de facto* independent as the 1992-1994 war resulted in Azerbaijan's withdrawal from NK. Yet, the government of Azerbaijan rejects the referendum and change of its territorial landscape as it regards NK as an inseparable part of its territory (Freizer, 2014). The 2009 International Crisis Group briefing warned on the difficulty of sustaining the Nagorno-Karabakh status quo (International Crisis Group, 2009), while the International Crisis Group (2011) biefing already called for an urgent action to prevent a war between Armenia and Azerbaijan: "An arms race, escalating front-line clashes, vitriolic war rhetoric and a virtual breakdown in peace talks are increasing the chance Armenia and Azerbaijan will go back to war over Nagorno-Karabakh. Preventing this is urgent" (p.1).

Thus, the conflict over Nagorno Karabakh between Armenia and Azerbaijan remains unresolved since 1994 with high uncertainty of peace due to the absence of peace agreement and numerous violations of ceasefire agreement since 2008 (International Crisis Group, 2011). In the case of Armenians, the conflict over Nagorno Karabakh is viewed as both ethnic and territorial issue related to national (group) identity. Hence, individuals within the group (Armenians) may regard this as a threat to a group's (nation's) survival. Homogeneity in ethnicity, the small size of the group and its territory are likely to make the concern over group's survival a primary issue.[8]

A United Nations Population Fund (UNFPA) report and the data therein based on household and women surveys in Armenia (Abrahamyan et al., 2012), shows that the third most frequently given reason for son preference is: "boys are defenders of homeland" (Figure 4). In addition, the published report shows that the prevalence of son preference in an individual's immediate environment (friends, neighbors) is higher than that within own family. According to Abrahamyan et al. (2012), in the individual's immediate social environment, the (perceived) share of people with son preference is ten times higher (59.3%) relative to

[8]Armenia has a largely homogeneous population in terms of ethnicity (98.1% Armenians), language (Armenian: 97.9%) and religion (92.1% Apostolic Christians)(The World Factbook, 2017). In addition, the relatively small size of the Republic of Armenia (population of 3,045,191), compared to Azerbaijan (population of 9,961,396; ethnic Azerbaijani: 91.6%; Azeri language: 92.5%; Shia Muslim: 96.9%) indicates that an ethnic and territorial conflict is likely to increase the perceived threat for a group's survival according to the conceptual framework described in Section 2.

those with daughter preference (5.6%); whilst according to the same report, within individual's extended family the perceived share of people with son preference is six times higher than the share of people with daughter preference (p.28).

[Figure 4 about here.]

Moreover, a local media analysis on the influence of TV in shaping social behaviour of teenagers in Armenia (Martirosyan et al., 2015) shows that the most popular show on the Armenian TV is the one called "In the Army" ("Banakum"), which describes the daily life of army servants in a humorous manner. Service in the national army of Armenia is based on the draft at the age of 18 and lasts two years. As part of this, young males are also 'randomly' located to serve in the conflict region of Nagorno Karabakh. Another media analysis on the Armenian-Azerbaijani relations ("Yeni Nesil" Journalists Union and Yerevan Press Club, 2009) shows that almost all of the coverage about Azerbaijan in the Armenian media is related to the Nagorno Karabakh conflict (same pattern for the Azerbaijan media on Armenia).

Thus, one can infer that horizontal cultural transmission of group survival values is at play in the context of Nagorno Karabakh conflict. It is clear that the conflict concerns are quite present in the media and among the individuals in Armenia. In result, the Nagorno Karabakh conflict has indirectly created an environment were males are valued as the defenders of the country (Dudwick, 2015).

Armenia has been characterized with low levels of fertility since late 1980s. Since 2000, it has been around 1.5, below the replacement level, with negligible variations from one year to another (World Bank, 2015). Moreover, due to various reasons, abortions in Armenia and in the wider South Caucasus have become a common method for controlling fertility levels and achieving desired sex composition of offspring (Michael et al., 2013; Dudwick, 2015), which is reflected in highly skewed sex ratios at birth.

In sum, Armenia presents an highly relevant setting to test the link between conflict, son preference and skewed sex ratios at birth. Existing individual level data from the country enables us to test the link between son preference and fear of conflict, whilst the community level census data allows us to construct a natural experiment where the perceived threat is set to vary with the distance to the center of the conflict region and the period of intense clashes after the ceasefire agreement. The next section describes the data used for this analysis in more detail.

4. Data and Descriptive Statistics

Our study uses an individual-level dataset to test the *hypothesis 1* and a community-level dataset to test the *hypothesis 2* from section 2. Namely, the individual-level dataset allows us to explore the link between concerns over conflict and son preference. We then test the effect of threat of conflict on sex ratios at birth by employing a community-level dataset. The description of these datasets follows.

Individual-level data. To study the individual-level correlates of son preference, we use unique data drawn from the Caucasus Barometer (CB), an annual nationally-representative household survey on a wide range of demographic, social, economic and political variables conducted by the Caucasus Research Resource Centers (CRRC) since 2004. The CB is one

of the few high-quality datasets in the countries of the South Caucasus and has been used in other published studies on the region (e.g., Habibov and Afandi, 2011; Antinyan, 2016; Mavisakalyan and Meinecke, 2016; Mavisakalyan, 2018).

We use the 2010 wave of the survey since it includes information on the respondents' son bias not available in other waves. This also matches the last period in the community-level dataset. Our sample consists of adults aged 18-80 years old, 1,861 observations in total, which comprises 97% of the raw sample.[9] Additionally dropping the observations with missing values leads to a sample of 1,676 observations employed in the baseline analysis.[10]

Table 1 presents the descriptive statistics for the main variables used in the analysis. The CB 2010 contains questions that ask about the respondents' prioritisation of the two most important issues facing the country. Based on that, we define the variable FEAR OF CONFLICT that takes on the value 1 if a respondent reported insurance of peace or territorial integrity as one of their top concerns and 0 otherwise. In our sample, 21% of people are concerned about conflict, as captured by this variable.

As Table 1 demonstrates, FEAR OF CONFLICT is clearly related to SON BIAS, our dependent variable that takes on the value 1 if the respondent's preferred gender for a single-child family is a boy and 0 otherwise. While 54% of all respondents have son bias, son bias is significantly more prevalent among those who are concerned about conflict compared to those who have no such concern (a difference of 14 percentage points).

Our analysis controls for standard demographic and socio-economic characteristics of individuals. We allow the preferences over the gender of a child to differ by the respondents' gender, age and family status and include controls for these characteristics.[11] Males comprise 49% among those who have no fear of conflict and 52% among those who have such fear. Older individuals as well as those who have a partner are more prevalent among those who fear of conflict compared to those who don't.[12]

We control for individuals' education, distinguishing between those with school education and below, EDUC$\leq$ 10, comprising 42% of the sample; secondary technical or incomplete university education, EDUC 11-14, comprising 35% of the sample; and a first or a higher-level university degree, EDUC$\geq$ 15 (omitted category), comprising 23% of the sample.[13] Fear of conflict appears to increase with educational attainment. Forty-three percent of individuals who don't fear of conflict have no more than 10 years of education; among

[9]The remaining 3% are those over the age of 80. The results are largely insensitive to the presence of these individuals.

[10]The number of missing observations for the key variables of interest is small; e.g. data on the variables used in the construction of measures for son bias and conflict as a primary concern are missing for 0.64% of individuals only.

[11]While we distinguish between individuals with or without a partner, we do not include the number of children as a control in the baseline regressions since differences in fertility decisions are endogenous in our context. Controlling for the number of children the respondent actually has or for the ideal number of children s/he thinks a family should have leaves the results unaffected; these variables are also insignificant throughout. The results are available on request.

[12]We explored the possible non-linearity in the relationship between age and son bias, by additionally controlling for an age-squared term; the estimates on this term were insignificant throughout.

[13]The definitions are based on the number of years of education associated with the three levels of attainment, following the approach taken in previous studies (Duncan and Mavisakalyan, 2015; Mavisakalyan, 2018).

those who do fear of conflict the share of those with no more than 10 years of education is 36%. On the other hand, 22% of individuals who do not fear of conflict and 27% of those who do fear of conflict have a university degree.

The next group of covariates is economic standing of individuals. We control for employment status, distinguishing between those with or without a job. Employment rate is 39% in the sample. Among individuals who fear of conflict, 43% are employed; this is considerably higher than the employment rate of 38% among those with no fear of conflict. Looking at self-reported measures of relative economic standing yields similar results. We distinguish between individuals who perceive their economic standing to be poor (21%), fair (65%) and good (14%). In the sample of individuals who report not having fear of conflict, 22% are of poor economic standing. Among those who do fear of conflict 16% perceive their economic standing to be poor. Meanwhile, the share of individuals with good economic standing is slightly higher among those who fear of conflict compared to those who don't fear of conflict.

Finally, we include dummies for the location of residence, distinguishing between the residents of capital cities, comprising 34% of the sample; other urban localities, comprising 33% of the sample and rural localities, comprising the remaining 33% of the sample. Among individuals who fear of conflict, 39% reside in rural localities, relative to 31% rural residents in the sample of those who do not fear of conflict. Yet, urban residents comprise 31% of those who fear of conflict and 34% of those who don't have such fear.

[Table 1 about here.]

Community-level data. We use data from 2001 and 2011 Population Censuses of Armenia. Armenia has 11 administrative divisions, including 10 provinces (marzes) and the capital - Yerevan. Our dataset comprises 72 communities within these provinces and Yerevan, including all the cities and towns, as well as the largest villages (with over 5000 inhabitants) in the country. The median number of communities in a province is 6, with a minimum number of 3 and maximum of 15 across the provinces.

The census data provides *de jure* (officially registered) and *de facto* number of individuals, disaggregated by gender and age groups. The age groups are defined in categorical terms: 0-4, 5-9, 10-14, 15-19, 20-24, and so on. Based on this, we calculate the number of boys and girls of 0-4 years of age in the following periods: 1987-1991, 1992-1996, 1997-2001, 2002-2006 and 2007-2011. The way we do this is by using the 2001 census to construct the number of 0-4 years old females and males up to 2001; we use the data from 2011 census thereafter. Since some of the small communities were included in the second but not in the first census, we make use of the older age cohorts in the 2011 census (namely, 20-24 years olds), to construct the *de jure* 0-4 years-old population for those initially missing communities.[14] It is important to note that the use of census 2001 for 1987-1991 ignores the child mortality in-between, however it is likely to be low as infant mortality rate in Armenia was much below the world average in 1990 (37.9 infants per 1000 live births, it decreased to 15.3 in 2011) (World Bank, 2015).[15]

[14] If individuals have migrated but not officially changed their residence status before the birth of the child, then their migration is not registered in the *de jure* data.

[15] The world average infant mortality rate in 1990 was 60.7 per 1000 live births.

We construct a pre-treatment period by aggregating the data from the two pre-ceasefire periods that are similar to census age group intervals: 1987-1991 and 1992-1996. Although the ceasefire agreement was in 1994, in our study the period stretches to 1996 because the census data includes information on age groups only and not on each age specifically for each community in our sample. The average sex ratio at 0-4 ages during the war period and right after it (1992-1996) was 107 compared to 105 in the pre-war period from 1987-1991. However, as Figure 5 shows, the sex ratios at 0-4 ages have the opposite pattern during the war relative to pre-war period - communities closer to the conflict region Stepanakert have lower sex ratios at 0-4 ages. Yet, there is a large heterogeneity in sex ratios at 0-4 ages among the communities further away from Stepanakert observed by quite dispersed data points and large confidence intervals. Such short-term changes in SRB (figure 6 shows that it reversed again after the war) can be due to war-related deaths or migration that disproportionately affected families with boys in some communities.[16]

[Figure 5 about here.]

Thus, we use a community-based panel dataset of sex ratios for 0-4 years-olds in 4 periods: a pre-ceasefire period that stretches from 1987 to 1996, and three post-ceasefire periods, namely, 1997-2001, 2002-2006, and 2007-2011. On the one hand, the aggregation of the war period with the pre-war period normalizes the distribution of the sex-ratios at birth before the ceasefire, and, on the other hand this solves any possible serial correlation problems before the treatment at a community level (Bertrand et al., 2004). We use two variables of geographic distance as a proxy for exposure to conflict and ultrasound technology, respectively. For that purpose we use the travel distances in kilometers from each community to Stepanakert, the center of Nagorno Karabakh conflict region, as a proxy variable for the fear of conflict. We use the travel distance to the capital city of Armenia, Yerevan, as a proxy for access to ultrasound technology. Distance is commonly used in the literature as an instrument or a proxy for conflict exposure and access to markets (Voors et al., 2012; Verwimp and Van Bavel, 2013).[17]

[Figure 6 about here.]

Figure 6 depicts the correlations between sex ratios at 0-4 years of ages ("M/F Sex Ratio") and the distance to the center of Nagorno Karabakh, Stepanakert, for all four periods. In the period of 1987-1996 and 2002-2006, we observe a slightly negative correlation between the sex ratios in this age group (SRB) and community's distance to Stepanakert. However, confidence intervals are quite large for detecting any statistically significant differences. In the 1997-2001 period, the relationship seems slightly non-linear, again with large confidence intervals. In the last period of 2007-2011 we observe a strong inverse relationship with small confidence intervals indicating that the further away a community is from Stepanakert the lower is the SRB. The strongest effects are driven by communities that are between 200-350 km away from Stepanakert (less or around the average distance). Note that this is the period when the number of ceasefire breaches started to intensify between Armenian, NK and Azerbaijani troops. Based on these observations, we divide our sample of communities

[16] This is however a mere speculation as we do not have detailed data on refugees or deaths to confirm.

[17] We do not employ other measures for conflict exposure due to lack of reliable and available data on fatalities and casualties over the Nagorno Karabakh conflict in the post-ceasefire period.

into treatment and control groups, and take the average distance to Stepanakert as the cut-off point. Communities are assigned to the treatment group if their distance to Stepanakert is less than the cut-off; see the map of 'treated' and 'control' communities in Figure 7.

[Figure 7 about here.]

Table 2 shows that in the baseline period (pre-ceasefire) mean SRB in treatment communities is higher compared to the communities in the control group (107 vs 105). In addition, travel distance to Yerevan is larger for the treatment communities while the average distance to Stepanakert is smaller by construction.

[Table 2 about here.]

Next, we present the formal empirical analysis of the link between fear of conflict and son bias.

5. Methods and Results

Our empirical analysis on the link between fear of conflict and son bias proceeds in two steps. We start with individual-level estimations to study how fear of conflict affects son bias in terms of attitudes. We then analyse the relationship at the level of communities, focusing on son bias in terms of actions by directly looking at the sex ratios at 0-4 ages. In what follows, we present the details of employed empirical methods followed by discussions of associated results in each step.

Individual-level. To evaluate the baseline relationship between fear of conflict and son bias, we consider a model in which the propensity for son bias, $Bias_i^*$ for an individual i is assumed to depend on the fear of conflict, $Fear_i$ together with series of additional controls X_i for demographic, socio-economic and location characteristics. Unobserved factors ε_i further contribute to the propensity for son bias, leading to an equation of the form

$$Bias_i^* = X_i\beta + \delta Fear_i + \varepsilon_i \text{ for all } i = 1, ..., N. \tag{1}$$

Observed son bias $Bias_i$ is assumed to relate to latent propensity through the criterion $Bias_i = 1(Bias_i^* \geq 0)$, so that the probability of having a son bias under an assumption of normality for ε_i becomes

$$Pr(Bias_i = 1|X_i, Fear_i) = \Phi(X_i\beta + \delta Fear_i), \tag{2}$$

with marginal effect of fear of conflict derived from the estimated model thus:

$$\frac{\partial Pr(Bias_i = 1|X_i, Fear_i)}{\partial Fear_i} = \delta\phi(X_i\beta + \delta Fear_i). \tag{3}$$

Baseline results. The marginal effects described in (3) evaluated at the sample means are reported in Table 3. We start with a parsimonious specification which excludes the additional controls X_i. Consistent with the descriptive statistics in the previous section, the estimated marginal effect for this parsimonious model reported in column (1) confirms a significant and positive relationship between Fear of conflict and Son bias.

Next, we control for the demographic characteristics of individuals. The results reported in column (2) demonstrate that males are more likely to hold a son bias than females. Interestingly, age is negatively related to the probability of son bias, while having a partner has

no statistically significant effect. Controlling for these variables does not affect the positive significant relationship between FEAR OF CONFLICT and SON BIAS.

Education attainment of individuals is accounted for in the estimates reported in column (3). University-educated individuals are less likely to hold son bias relative to those with lower educational attainment. While the estimates on EDUC$\leq$ 10 and EDUC 11-14 are highly economically and statistically significant, their inclusion leaves the estimated marginal effect on FEAR OF CONFLICT largely unaffected.

In column (4) we report the marginal effects from the regressions that control for employment and relative overall economic standing of individuals in addition to their demographic characteristics and educational attainment. We do not find a significant relationship between these variables and SON BIAS, while the significant positive effect of FEAR OF CONFLICT persists.

Finally, we account for the type of the residential localities of individuals by distinguishing between the residents of capital cities, other urban areas and rural areas. The last column of Table 3 reports the results. Those who live in rural areas are significantly more likely to have son bias, relative to the residents of capital cities. These results also confirm the positive relationship between FEAR OF CONFLICT and SON BIAS. The marginal effect of changing FEAR OF CONFLICT from zero to one, after accounting for the entire list of baseline covariates, is equal to 12.2 percentage points. This implies that the probability of having a son bias is almost 23% higher.

[Table 3 about here.]

Alternative measurement of key variables. The previous sub-section established a strong positive association between FEAR OF CONFLICT and SON BIAS. Here we explore whether this result is sensitive to the way our key measures are defined.

In Table 4 we study the robustness of the results to the definition of FEAR OF CONFLICT we use. To allow for comparisons, column (1) restates the baseline estimates with full set of controls (these are identifcal to those reported in column (5) of Table 3). Next, we disaggregate FEAR OF CONFLICT along two dimensions. First, we investigate whether the degree of concern with peace or territorial integrity matters by refining our measure to distinguish between those who identiy these matters as a first or as a second priority. The results using dummies for these two groups are reported in column (2) (omitted category are those who do not perceive peace/national security to be a key national issue). We estimate positive marginal effects on both of these variables, however only that on CONFLICT 1ST CONCERN is statistically significant. Second, we introduce a distinction between those who think peace is a key national issue and those who think territorial integrity is. In column (3) we report the results of regressions that include dummies for these groups as the key explanatory variablles. The marginal effects on both PEACE AS CONCERN and INTEGRITY AS CONCERN are positive and significant.

[Table 4 about here.]

Second, we explore whether FEAR OF CONFLICT has an effect on other dimensions of gender bias beyond its effect on son bias at birth. We therefore employ alternative dependent variables in the analysis reported in Table 5 (column (1) restates the baseline estimates). The CB 2010 contains rich information on the respondents attitudes on gender roles. Based on

this information, we generate dummy variables to distinguish the following individuals from others: (i) those who believe a university education is more important for a boy than for a girl; (ii) those who think men should have more right to a job when jobs are scarce; (iii) those who think the man should normally be the breadwinner in the family; and (iv) those who believe the man should be the decision-maker in the family. The results of the regressions using these measures of gender bias as the dependent variables are reported in columns (2)-(5) of Table 5. They suggest that the negative effects of the FEAR OF CONFLICT potentially extend to other dimensions of gender bias including the beliefs around the rights for education, jobs and earnings, but not around the decision-making in the household - the marginal effect on FEAR OF CONFLICT when MEN SHOULD BE THE DECISION-MAKER is employed as the dependent variable is insignificant (column (5)).

[Table 5 about here.]

Analysis by different sub-samples. The analysis in the previous sub-section extended the baseline results by employing alternative measures of the dependent variable and the independent variable of interest. Here, we further explore the possible heterogeneity in the effect of FEAR OF CONFLICT according to several observable characteristics of individuals. The results of this exercise are summarised in Table 6.

First, we consider whether males and females respond differently to fear of conflict by re-estimating the baseline model separately for the two groups. The results reported in the first two columns of Table 6 confirm that the positive significant relationship between FEAR OF CONFLICT and SON BIAS is observed in the sub-samples of both males and females. However, the magnitude of this effect is stronger for males: the marginal effect of changing the dummy FEAR OF CONFLICT from 0 to 1 is 14.9 percentage points in the sub-sample of males, and 7.6 percentage points in the sub-sample of females.

Second, we explore the possible heterogeneity by age group. To that end, we re-estimate the baseline model in the sub-samples of relatively older (46-80 years old) and younger (18-45 years old) individuals. In both sub-samples, FEAR OF CONFLICT is associated with an increased probability of SON BIAS. The effect is particularly pronounced in the older cohort: the marginal effect of FEAR OF CONFLICT on SON BIAS is 14.1 among 46-80 years-olds and 10.3 among 18-45 years-olds.

Finally, in the last two columns of Table 6 we analyse the relationship between FEAR OF CONFLICT and SON BIAS by educational attainment, distinguishing between those without and with post-school education. While in both samples we confirm the baseline finding, interestingly, we estimate a larger marginal effect of FEAR OF CONFLICT on SON BIAS among individuals with post-school education. For individuals with at most 10 years of education, the marginal effect of changing the variable FEAR OF CONFLICT from 0 to 1 is equal to 10.2; for those with 11 or more years of education (corresponding to the tertiary education years) it is equal to 13.8.

[Table 6 about here.]

Addressing endogeneity. We establish a significant positive relationship between FEAR OF CONFLICT and SON BIAS and we demonstrate that it largely persists when alternative measurements of the two variables are employed as well as when we limit the analysis to specific

groups of individuals. However, FEAR OF CONFLICT may be correlated with unobserved characteristics that affect SON BIAS, leading to biased estimates. Here, we attempt to mitigate the effect of unobserved heterogeneity using several approaches.

First, we simply add proxy variables that could be correlated with the unexplained components of SON BIAS. The results of this analysis are presented in Panel A of Table 7. To allow for comparisons, column (1) restates the results of the baseline model with no additional controls.

In the baseline results we established that the probability of SON BIAS decreases with human capital, as captured by educational attainment. Our estimates of FEAR OF CONFLICT would be biased, if FEAR OF CONFLICT varied by hitherto unobserved dimensions of human capital. Here we attempt to capture for human capital more completely, by additionally controlling for Russian language proficiency of individuals, an important ingredient of human capital in transition countries (Duncan and Mavisakalyan, 2015; Mavisakalyan, 2017). We distinguish between those who have some fluency in the language (report advanced/intermediate knowledge), those who speak it at home, and others. As seen in the results reported in column (2), Russian proficiency appears to be negatively correlated with SON BIAS, similar to the effect of educational attainment established earlier. However, the estimated marginal effects are not statistically significant, and their inclusion does not affect the estimates on FEAR OF CONFLICT.

Next, we consider several potential sources of conservative attitudes of individuals, that may be correlated with both FEAR OF CONFLICT as well as SON BIAS. First, we explore the potential role of the exposure and attitudes to foreigners by including two additional controls in the regression. We distinguish between those who had not had any trips outside the country within the preceding 5 years and those who had. We additionally include a proxy for individual's racial tolerance constructed based on their approval of marriage with Chinese people.[18] While we do not find a statistically significant relationship between travelling overseas and having a son bias, we establish that racially tolerant individuals are less likely to have son bias. In spite of this, the positive significant relationship between FEAR OF CONFLICT and SON BIAS persists.

We also explore whether accounting for religion may alter the central result of this study, by controlling for individuals' religious affiliation, distinguishing between those with majority (Armenian Apostolic Church) religious affiliation and others; as well as for their religiousity, distinguishing between those who consider themselves 'very religious' and others. Doing this leads to a drop in the sample size due to missing values on the measures of religion. In this sample, using the augmented list of control variables we estimate a marginal effect of 10.7 on FEAR OF CONFLICT. While smaller in magnitude compared to the estimate from the baseline model, this is still a highly significant effect.

Next, we explore an additional possibility: that individual vulnerability may affect fear of conflict as well as being related to reinforcement of traditional values such as son bias. To mitigate the bias that such possibility may introduce, in the regressions reported in column (5) we control for two additional variables. First, we include a dummy that takes 1 if the

[18] The choice of this measure is largely driven by data availability (e.g. there is no information on attitudes to African people in the dataset).

individual claims there are enough people to whom he/she feels close to and 0 otherwise. We include a second dummy variable, which takes 1 if the individual experiences 'a general sense of emptiness' and 0 otherwise. There is no statistically significant link between these variables and SON BIAS; the statistically significant effect of FEAR OF CONFLICT persists.

Finally, in column (6) we additionally control for institutional trust, a variable that may be linked to fear of conflict as well as mediating cultural values individuals hold. We focus on a relevant institution for our context, army, distinguishing between those individuals who have a distrust in army and others. The estimated marginal effect on DISTRUST IN ARMY, while insignificant, potentially suggests that son bias may be prevalent among those who are lacking institutional trust.[19] The estimated marginal effect on FEAR OF CONFLICT is positive and statistically significant, although it drops from 12.2 to 10.8 after including these additional controls. Nevertheless, this is a highly economically significant effect, implying that the probability of having a son bias is 20% higher for those who have the fear of conflict.

Given the richness of information available in the dataset, the approach of controlling for previously omittted characteristics of individuals adopted so far potentially mitigates the influence of important sources of unobserved heterogeneity, however it does not eliminate it entirely. A more direct way of addressing the problem of unobserved heterogeneity in the presence of a binary dependent variable and a binary endogenous variable is to estimate a bivariate probit model, subject to availability of instrument. We identify one plausibly exogenous instrument in our application, HISTORY OF FORCED DISPLACEMENT. This is a dummy variable that takes 1 for individuals who were either themselves forced to move or were displaced during the Communist regime or had a household member who was explosed to such forced displacement, and 0 otherwise.

We exploit this additional variable to estimate a bivariate probit model, where it is included in the equation of FEAR OF CONFLICT but excluded from the equation of SON BIAS. The results reported in Panel B of of Table 7 confirm the positive significant relationship between FEAR OF CONFLICT and SON BIAS. In support of our identification strategy, we also estimate a highly statistically significant coefficient on HISTORY OF FORCED DISPLACEMENT in the regression of FEAR OF CONFLICT.

[Table 7 about here.]

The exclusion restriction underlying this approach would be violated if there is the possibility that the HISTORY OF FORCED DISPLACEMENT affects SON BIAS through mechanisms other than FEAR OF CONFLICT. Naturally, it is not possible to control for all possible variables that might be correlated with the HISTORY OF FORCED DISPLACEMENT and SON BIAS. Hence, we take a third strategy to reduce the bias generated by unobserved heterogeneity: we employ a matching approach to examine the impact of FEAR OF CONFLICT on SON BIAS for individuals who have a fear of conflict (treatment group), compared to those who do not have such fear but are as similar as possible with regard to characteristics that affect the

[19] We additionally explored the probability that the effect of FEAR OF CONFLICT on SON BIAS may vary among those trusting and distrusting army by including an interaction term of FEAR OF CONFLICT and DISTRUST IN ARMY in the regression. The results on the interaction term were insignificant.

outcome variable of interest (control group). Formally, our measure of interest is the average treatment effect on the treated (ATT) which is estimated based on matching as follows:

$$\tau_{ATT}(x) = E[Bias(1)|T = 1, X = x] - E[Bias(1)|T = 0, X = x] \tag{4}$$

where *Bias* is our outcome variable, T indicates whether an individual is explosed to treatment $(T = 1)$ or not $(T = 0)$ and x is a vector of relevant characteristics that affect the outcome varaiable. First, we employ entropy balancing to select matches for the units exposed to treatment (Hainmueller, 2012). Entropy balancing is in a way a generalisation of conventional matching approaches since it employs a synthetic control group that represents "a virtually perfect image of the treatment group" (Neuenkirch and Neumeier, 2016, p. 113). Second, we follow a more traditional approach employing propensity score matching (Rosenbaum and Rubin, 1983).

The results of this analysis are presented in Table 8. First, we report the estimates of ATT based on using entropy balancing to select matches for individuals explosed to treatment (column 1). In columns (2) and (3) we report the average treatment effects from kernel and radius matching estimators. The estimated effects in all three cases are statistically significant and similar in magnitude. This further confirms that FEAR OF CONFLICT has non-zero and potentially large positive effect on son bias of individuals.

[Table 8 about here.]

Community-level. We estimate the differences in sex ratios at 0-4 ages in communities closer to the conflict region before and after ceasefire using difference-in-difference estimation strategy. We use travel distance between each community and Stepanakert, the center of Nagorno Karabakh conflict region, as a proxy for "fear of conflict", and distance to the capital city of Armenia, Yerevan, as a proxy variable for access to advanced ultrasound technology. Distance is commonly used as a proxy variable or an instrument in the conflict literature (Voors et al., 2012). In addition, as described in section 3, the conflict over Nagorno Karabakh started due to territorial independence requests by large share of Armenian population in the disputed region. These factors are independent of sex ratios at birth in Armenian communities close to the center of the Nagorno Karabakh - Stepanakert.

To identify the effect of fear of conflict on son bias at the community level, we use a panel data regression of the following form:

$$\begin{aligned} SRB_{ct} = \alpha + \sum_{t=1}^{3} \gamma_t Post_t + \sum_{t=1}^{3} \theta_t (Post_t * Treat_c) + \sum_{t=1}^{3} \zeta_t (Post_t * CloseCapital_c) + \\ + \sum_{c=1}^{N} \eta_c (C_c * t) + \mu_c + \epsilon_{ct} \end{aligned} \tag{5}$$

where SRB_{ct} is the outcome variable - male over female sex ratios at 0-4 ages - in community c in period t. α is the constant term that denotes the differences in average SRB_{ct} when $t = 0$. $Post_t$ are the period dummies after 1996; the three time intervals (1997-2001, 2002-2006, 2007-2011) correspond to the three dummy variables for post-ceasefire periods $(t = 1, 2, 3)$. The baseline period is 1987-1996 $(t = 0)$. The period dummies also capture the

fertility decline during each period that affected all communities.[20] We focus on the *de jure* number of 0-4 year olds since this gives us the actual information on children born to that specific community.

$\sum_{t=1}^{3} \zeta_t(Post_t * CloseCapital_c)$ denotes period interaction terms with the distance to the capital city of Armenia (Yerevan), which teases out the community differences in access to ultrasound technology. The term $\sum_{c=1}^{N} \eta_c(C_c * t)$ captures the community level linear time trend that we include to control for the time-varying community-specific effects that also relaxes the common trend assumption of the difference-in-difference setting. μ_c denotes community fixed effects and ϵ_{ct} is the error term clustered at the community - treatment-level (Bertrand et al., 2004). In this setup we are able to identify whether the period of ceasefire breaches led to changes in pre-existing community-specific trends in the 'treated' communities. Migration out of the communities is not included in the dataset, which should rather result in a downward bias in our estimates. On the other hand, population flows should be captured by community-specific time trends in case of linearity of the migration patterns.

In our main specifications community c is included in the treatment group ($Treat$) if its distance to the center of conflict region (Stepanakert) is smaller than the mean distance in the sample (the cut-off). Otherwise, it is in the control group ($Treat_c = 0$). We are interested in the coefficient on $Post_t * Treat_c$ when $t = 3$: we expect to observe the 'treatment effect' in the period from 2007-2011 when ceasefire breaches intensified (International Crisis Group, 2011).

Figure 8 tests for common trends assumption in communities assigned to treatment and control groups. The vertical axis denotes male over female sex ratios at 0-4 ages (SRB). The red line depicts the SRB trends in the treatment group and the blue line - in the control group. Period 0 corresponds to the baseline time interval, 1987-1996. Period 1 corresponds to the first period after the ceasefire, namely 1997-2001, period 2 corresponds to the second period post ceasefire, 2002-2006, and period 3 corresponds to the third period after the ceasefire, 2007-2011. The sex ratios at birth in the treatment group are structurally higher than in the control group. But we observe that the treatment and control groups have parallel trends in the baseline period, and in the second to third period there is a slight divergence. In the third to forth period we observe quite divergent paths between treatment and control groups, where the SRB increases even further in the treatment group while it decreases in the control group. Next, we present the results from the regression analysis of the community level panel data.

[Figure 7 about here.]

Results. We present the community-level regression analysis using continuous measures of distances at the first instance (Table 9). Having established that a unit (km) change in distance to conflict is inversely correlated with the changes in SRB, we present the results for

[20] Data from Armenia Demographic and Health Surveys (DHS) shows that fertility ratios across Armenian provinces and communities do not differ from each other at the conventional levels of statistical significance, based on own calculation of the authors. DHS data and the census data used in the analysis match only on 40 communities, i.e. cities and towns. The rest of the DHS communities are very small villages of less than 5000 people (DHS, 2012).

treatment and control groups in Table 10. We follow up with tests for robustness of our findings in Table 11.

Column 1 of Table 9 displays the effects of each treatment period on the outcome variable SRB. The results show that with each subsequent period, sex ratios at birth have been increasing in all communities in Armenia (statistically significant at the one percent level). Column 2 adds an interaction term with Distance to Conflict, a continuous variable measured in kilometers. The estimates of the coefficients on the interaction terms suggest that there is no statistically significant relationship between unit increase in distance to the center of conflict region (Stepanakert) and SRB. We observe similar results in column 3, when period dummies interacted with Distance to Capital (Yerevan) are controlled for. Thus, the results from columns 2-3 show that neither access to technology nor proximity to the conflict explain changes in SRB unconditionally. To pursue our hypothesis further, in column 4 we consider the effect of Distance to Conflict on SRB, when access to technology is controlled for. We observe that in period 3, a 100 kilometer decrease in the distance to conflict (closer to Stepanakert) leads to SRB values close to 113, statistically significant at the five percent level (Post=3 $\times$ Distance to Conflict).

[Table 9 about here.]

Table 10 presents the main results for the community level analysis based on equation 5. Building on the initial results in Table 9, we assign the communities into treatment and control groups as described in section 4. In column 1 of Table 10 we estimate the differential effects of post ceasefire periods on the treatment and control groups, without controlling for the distance to technology. The coefficient of the interaction term Treat=1$\times$Post=3 shows that in the third period after the ceasefire, when the clashes started to intensify the sex ratios at birth increased by 9 in the treatment communities compared to the control communities, statistically significant at the five percent level.

In column 2 of Table 10, we separately test the effects of access to ultrasound technology (Close to Captial) on SRB. Close to Capital is a binary variable that equals 1 if a community's distance to the capital city Yerevan is less than the sample average. The results in column 2 show that access to technology is associated with an increase in SRB only in the first period after the ceasefire. Beyond the first period, the differential access to technology does not explain the differences in SRB across communities.

In column 3 Table 10, we observe that compared to the column 1, the period effects for Post=1 and Post=2 are smaller, which implies that much of the increase in SRB during this period may be driven by the increased access to technology. Nevertheless, the effects in the third period are statistically significant at the 5 percent level and the interaction term with the treatment group (Treat=1$\times$Post=3) shows that communities in the treatment groups experienced additional increase in the SRB in the third period.

Columns 1-3 in Table 10 include community fixed effects, which also control for community-specific time invariant omitted variables. While Figure 8 shows that common trends assumption holds for the treatment and control groups, in column 5 we relax this assumption by including community specific linear time trends. The community time trends control for time-varying unobserved heterogeneity within the communities. Once community time trends are included, we observe that the coefficients on the period dummies turn negative

and the size of the treatment effect in the third period increases by 6 points. In addition, the interaction terms with the Distance to Capital also become statistically significant in all three periods. These results help us to calculate the treatment effects for those communities that are closer to Yerevan and also closer to the conflict region - this would be the most affected communities. Here the fear of conflict would increase the preference for sons and the ease of access to technology makes it easier to act according to these preferences. The treatment communities observe 15 points higher SRB levels (e.g. 121) in the period when ceasefire violations started to intensify (2007-2011), compared to the pre-ceasefire period. The results in 10 also show statistically significant period dummies, especially in the second and third post-ceasefire period. Interestingly, the coefficients on the period dummies are positive before inclusion of the community level linear time trends, after the inclusion the coefficient turn negative. One possible explanation is that period dummies capture the fertility decline that is a country-wide phenomenon, not captured by distance variables. However once community level linear time trends are included, the variation in the SRB at the community level due to linear part of fertility decline is controlled for. The negative and statistically significant coefficients of period dummies then imply that controlled for the fertility decline and access to technology, the sex ratios at birth in the control communities decreased compared to the treatment communities.

[Table 10 about here.]

In Table 11 we test for the robustness of the result in Table 10 column 4. As Figure 6 shows, there are two communities in the sample that can be regarded as outliers. Therefore, in column 1 of Table 11, we re-estimate the model by excluding the two outliers. In this case we observe that both proximity to the capital city and to the center of the conflict region increase the level of SRB in the treatment group.

Since the landmass of Armenia is quite small, many of the communities can be in the treatment group and also in the group that is Close to Capital. To deal with this issue of confounding effects, we re-assign the communities into two different groups based on the cut-off of 25th percentile instead of the mean distance. Thus, those communities that are in the 25th percentile of the distance to conflict region are assigned to the treatment group, Treat25. Similiary, those communities that are in the 25th percentile of the distance to the capital - Yerevan - are assigned to the Close to Capital25 group. This way we can compare the conflict effects on the communities closest to the conflict region and the technology effects on the communities closest to the capital.

Column 2 of Table 11 shows that in the second and the third periods SRB was 10 and 18 points higher in the Treat25 group, statistically significant at the one percent level. We also find that the effects of technology on the communities in the close proximity to capital persist in all the three periods, and increase over time, statistically significant at least at the five percent.

Finally, in column 3 of Table 11, we run a *placebo* test by falsely defining the treatment group as those communities who have less than average distance to a northern city in Armenia that is close to the Turkish border - Gyumri. While Armenia has historically-determined testy relationship with Turkey, there is no actual conflict on that border. The results on the

interaction term between GyumriDist and the period dummies show negative and no statistically significant relationship. In third period, there is a small and negative relationship between distance to Gyumri and SRB, statistically significant at the 10 percent level. This *placebo* test confirms that our results are not driven by some type of unobserved heterogeneity correlated with distance itself but rather with the fact of being close to the conflict itself may lead to an increase in SRB.

[Table 11 about here.]

6. Conclusion

This study shows that conflict is an important contributor to high sex ratios at birth. We argue that by raising group survival concerns, it has the potential to exacerbate the son bias in a patriarchal society undergoing transitions to low fertility and increased access to ultrasound technology. We test this intuition in a context of a transition country that has seen both an eruption of a major inter-state conflict and a dramatic increase in sex ratios at birth in recent times - Armenia. At individual level, we compare those similar across a wide range of observable characteristics yet different in the extent of concern about the conflict facing their country. We show that the probability of having a son bias is 20% higher for individuals who are concerned about conflict. We then focus on communities, comparing those with similar access to technology, time-invariant characteristics and time-varying community level time trends but differently exposed to the conflict due to their differential distance to the conflict zone. We find that communities with less than average distance to the center of conflict zone experience 15 points higher sex ratios at birth (moving from 107 to 122 male births for 100 female births) in the periods of intense ceasefire breaches compared to the pre-ceasefire period.

That conflict may matter (and matter a lot) is a novel insight to the 'missing girls' literature. Our findings point towards potentially damaging consequences of conflict in broader settings, and offer a note of caution regarding gender equity in the war-torn countries of the wider region (Southeast Europe, Middle East, North Caucasus) and beyond. A possible policy suggestion based on our results is to provide greater gender-equity-focused public education and awareness campaigns in areas affected by conflict.

Our paper is a first attempt at exploring the association between conflict and missing girls. Several promising opportunities for future research remain. Establishing external validity of the results by exploring other contexts is essential. This study has highlighted some highly relevant cases extending beyond the usual examples of China and India - Albania, Azerbaijan, Georgia. Furthermore, our conceptual framework suggests that the mechanisms leading to son bias in a society facing a conflict threat have relevance for other gender equity outcomes. Indeed, our individual level results point at potential implications for access to education and jobs. Thus, the compounded gender equity consequences of conflicts are an important ingredient of this research agenda. Methodologically, there are several possibilities for refining the approach taken here, subject to data availability. While a strong emphasis of our empirical set-up has been on mitigating the issue of unobserved heterogeneity, it cannot be eliminated entirely in the absence of truly exogenous sources of variation in

the explanatory variable of interest (individual analysis) or when proxies are used to measure it (community analysis). By combining individual- and community-level analysis, our aspiration has been to not only study the reduced-form relationship between conflict and sex ratios at birth, but to empirically trace the mechanisms underlying the relationship. By showing that the son preference of individuals threatened by conflict is affected, we made a step in that direction. Looking at actual histories of abortion would be another important step, if relevant data becomes available.

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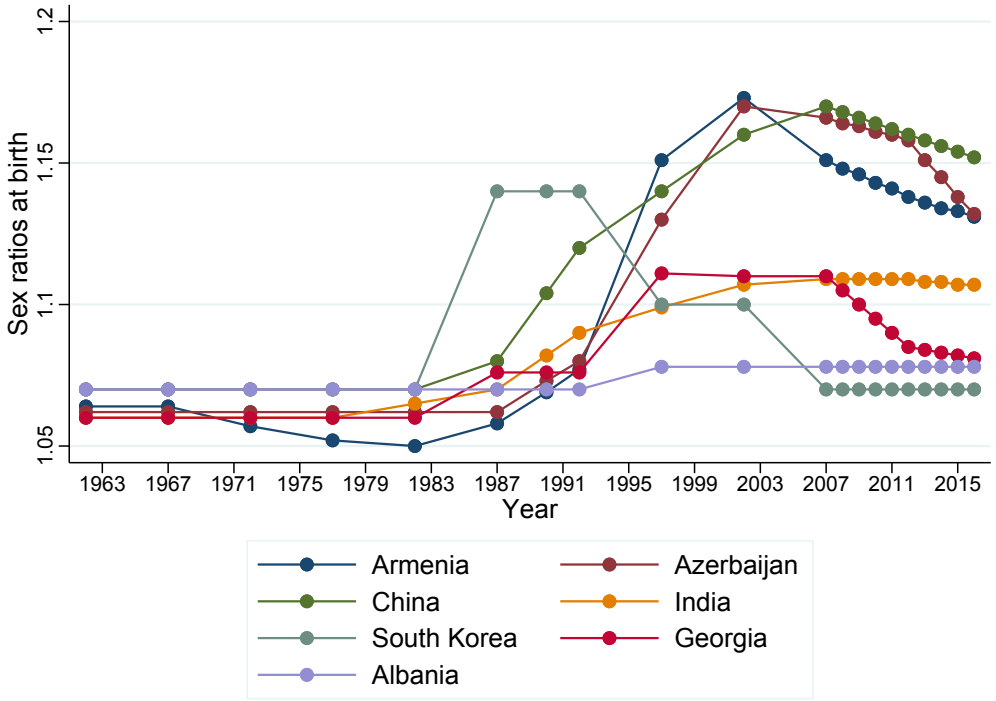
List of Figures

Figure 1: Trends in highly skewed sex ratios at birth, selected countries



Note. Sex ratios at birth (male births over female births) from 1962 to 2016 for countries with relatively high values, five year averages. Source: World Development Indicators (World Bank, 2015).

Figure 2: Conflict, son preference and sex ratios at birth

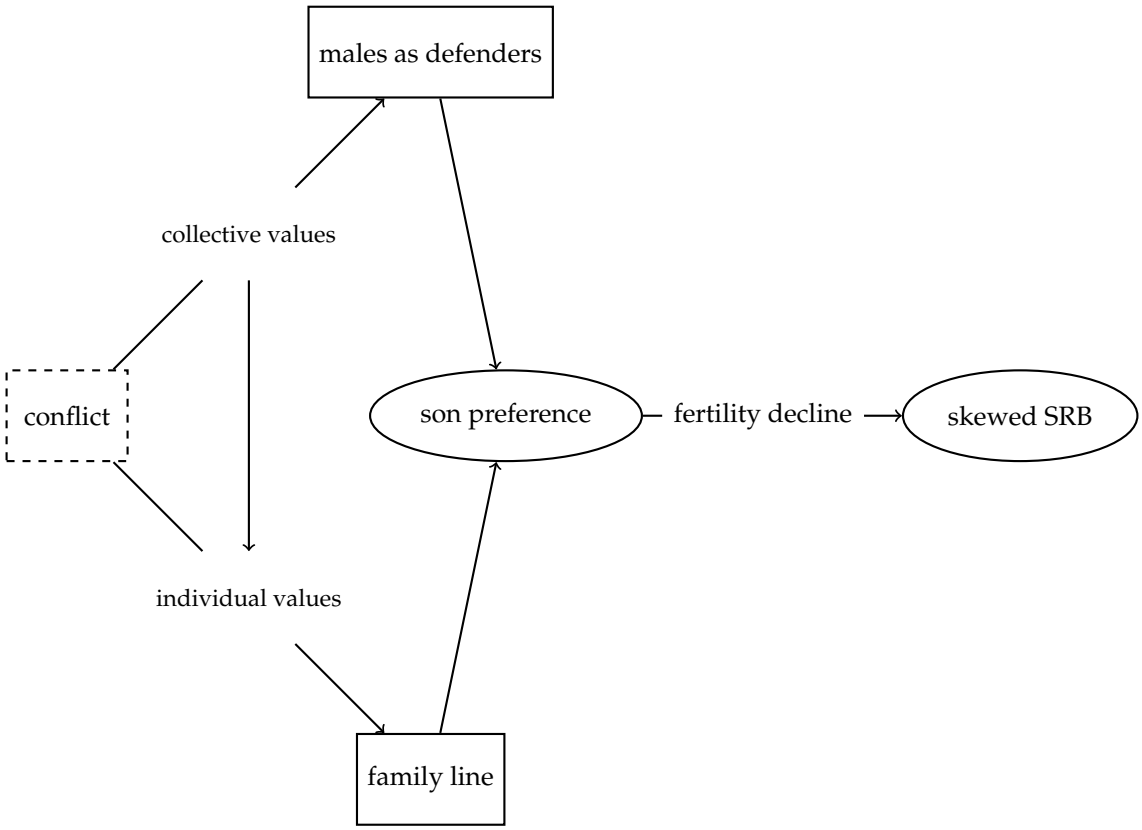
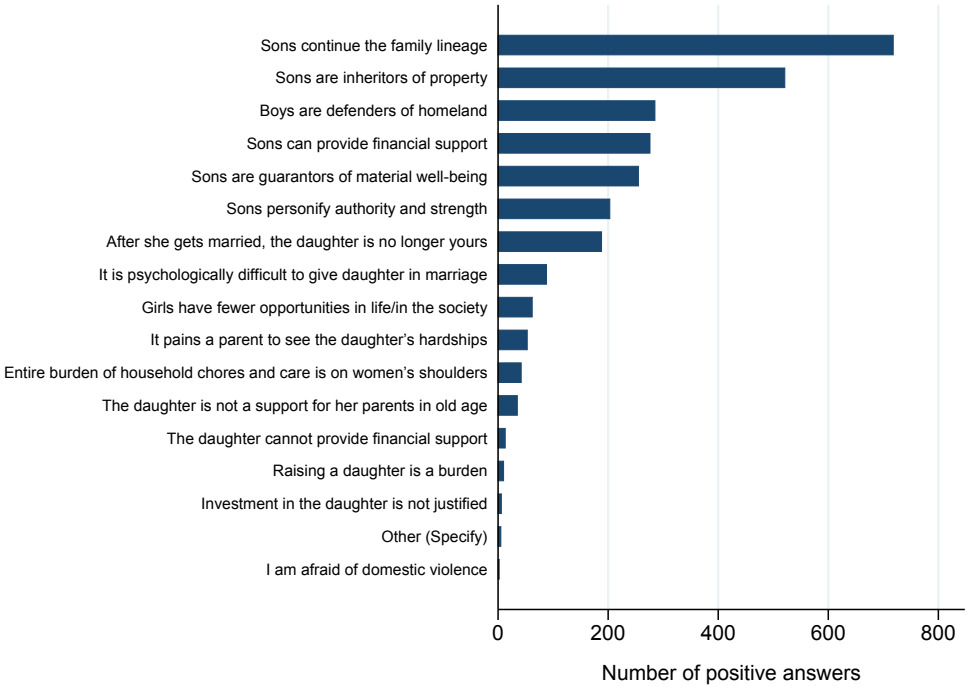


Figure 3: Nagorno Karabakh conflict: Unresolved territorial disputes after the war

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

Figure 4: Reasons for son preference: Armenian households, 2011

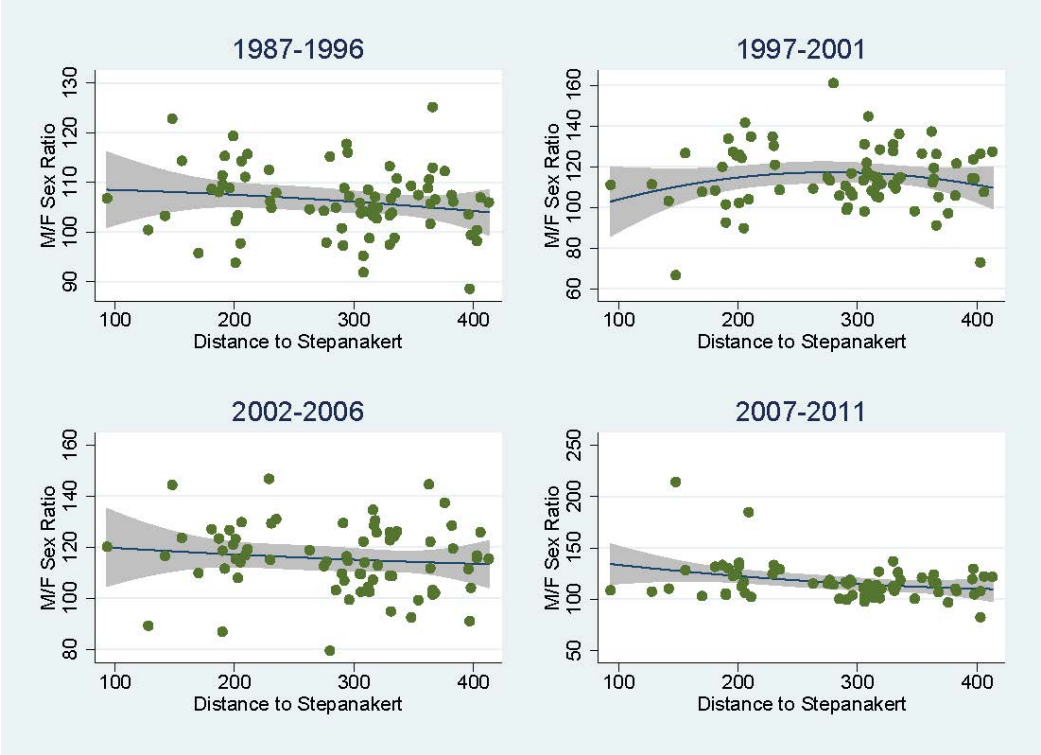


Note. The source is the household survey conducted in 2011 within the framework of Strengthening Sexual and Reproductive Health Services project (Abrahamyan et al., 2012). Responses are based on survey question asked in the sub-sample of women who express son preference: "Why does your family give preference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

Figure 5: Distance to conflict and sex ratios at birth in Armenia before and during war

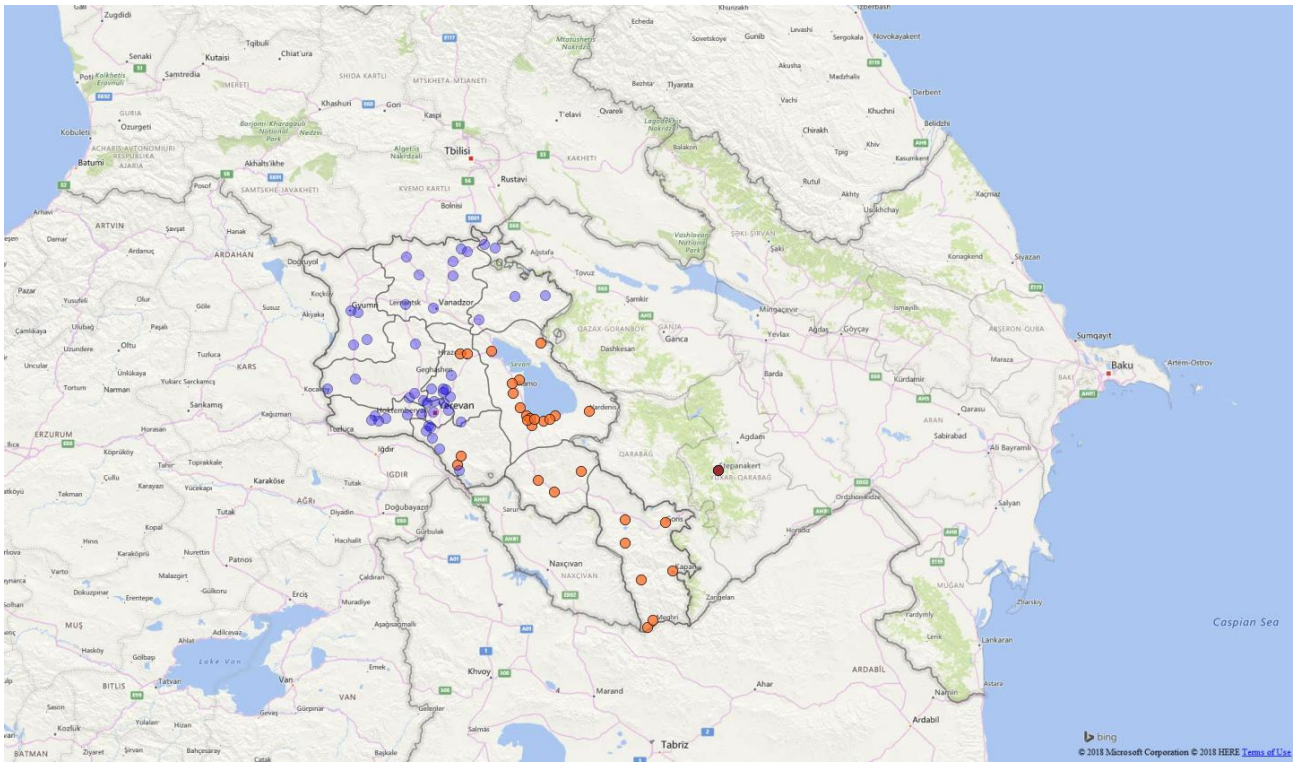
Note.Two-way quadratic prediction plots for the outcome variable SRB before and during war periods. The vertical axes denote sex ratios at 0-4 ages. The horizontal axes denote distance to the capital of the conflict region - Stepanakert - for each community in the sample. The green dots denote observations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

Figure 6: Distance to conflict and sex ratios at birth in Armenia, 1987-2011



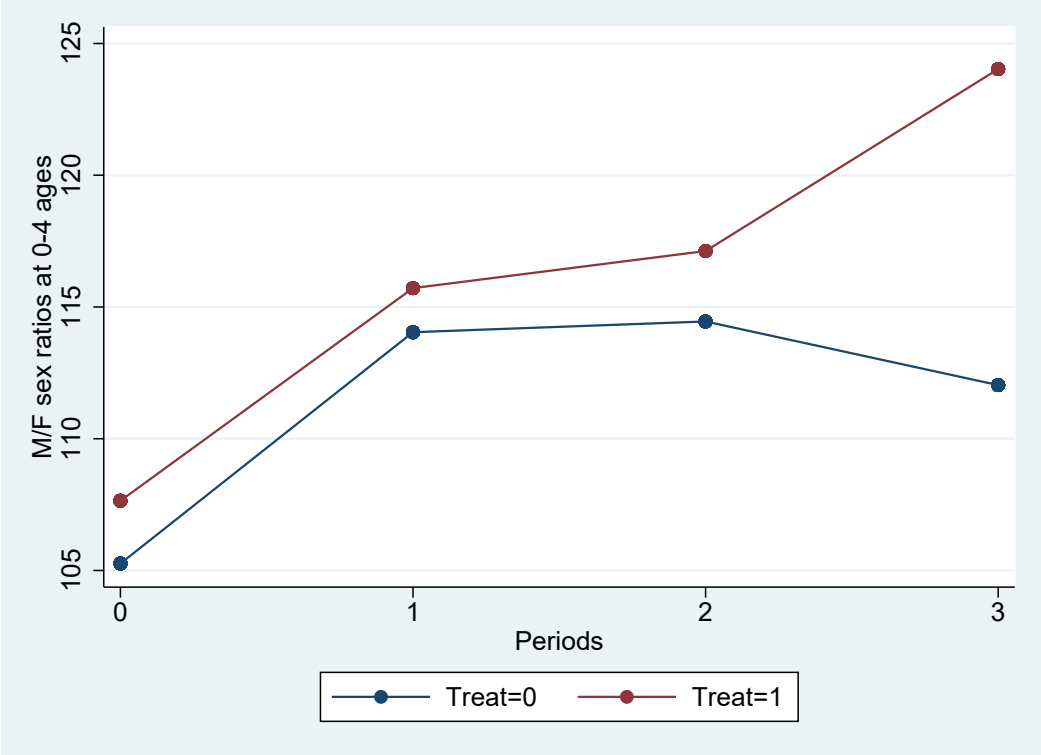
Note.Two-way quadratic prediction plots for the outcome variable SRB in each period. The vertical axes denote sex ratios at 0-4 ages. The horizontal axes denote distance to the capital of the conflict region - Stepanakert - for each community in the sample. The green dots denote observations for each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

Figure 7: Treatment and control communities: Armenia



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.

Figure 8: SRB trends in treatment and control groups



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.

List of Tables

Table 1: Individual-level descriptive statistics

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$\leq$ 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$\geq$ 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 reports having a job	0.38 (0.48)	0.43 (0.50)	0.39 (0.49)
POOR STANDING	0-1 binary variable; equals 1 if household's perceived economic standing is relatively poor	0.22 (0.41)	0.16 (0.37)	0.21 (0.40)
FAIR STANDING	0-1 binary variable; equals 1 if household's perceived economic standing is relatively fair	0.65 (0.48)	0.68 (0.47)	0.65 (0.48)
GOOD STANDING	0-1 binary variable; equals 1 if household's perceived economic standing is relatively good	0.14 (0.35)	0.16 (0.36)	0.14 (0.35)
CAPITAL CITY	0-1 binary variable; equals 1 if respondent lives in capital city	0.34 (0.48)	0.31 (0.46)	0.34 (0.47)
OTHER URBAN	0-1 binary variable; equals 1 if respondent lives in urban area	0.34 (0.47)	0.30 (0.46)	0.33 (0.47)
RURAL	0-1 binary variable; equals 1 if respondent lives in rural area	0.31 (0.46)	0.39 (0.49)	0.33 (0.47)
N		1318	358	1676

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

Table 2: Community-level descriptive statistics

	(1) Mean (s.d.)
Control group	
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)
Number of communities	47
Treatment group	
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)
Number of communities	29

Note.—Standard deviations in parentheses.

Table 3: Baseline individual model — probit marginal effects

Control variables	(1)	(2)	(3)	(4)	(5)
FEAR OF CONFLICT	0.138***	0.140***	0.146***	0.145***	0.122***
	(0.028)	(0.029)	(0.029)	(0.029)	(0.030)
MALE		0.108***	0.110***	0.109***	0.098***
		(0.025)	(0.025)	(0.026)	(0.026)
AGE		-0.002**	-0.002**	-0.002**	-0.001*
		(0.001)	(0.001)	(0.001)	(0.001)
PARTNERED		0.043	0.043	0.035	0.010
		(0.027)	(0.027)	(0.027)	(0.028)
EDUC$\leq$ 10			0.150***	0.151***	0.090**
			(0.031)	(0.033)	(0.035)
EDUC 11-14			0.125***	0.131***	0.105***
			(0.032)	(0.033)	(0.034)
EMPLOYED				0.008	0.030
				(0.028)	(0.028)
POOR STANDING				-0.021	-0.000
				(0.044)	(0.044)
FAIR STANDING				0.047	0.058
				(0.038)	(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.

Table 4: Individual model with alternative independent variables — probit marginal effects

Control variables	(1)	(2)	(3)
FEAR OF CONFLICT	0.122***		
	(0.030)		
CONFLICT 1ST CONCERN		0.126***	
		(0.035)	
CONFLICT 2ND CONCERN		0.072	
		(0.046)	
PEACE AS CONCERN			0.096***
			(0.035)
INTEGRITY AS CONCERN			0.123***
			(0.046)
Pseudo R^2	0.069	0.069	0.069
N	1676	1676	1676

Note.— Dependent variable is SON BIAS. CONFLICT 1ST CONCERN/CONFLICT 2ND CONCERN is 0-1 binary variables which equals to 1 if the peace/territorial integrity are rated as the 1st/2nd national issue; PEACE AS CONCERN is 0-1 binary variables which equals to 1 if peace is rated as the 1st/2nd national issue; INTEGRITY AS CONCERN is 0-1 binary variables which equals to 1 if territorial integrity is rated as the 1st/2nd national issue. Marginal effects for a discrete change of a variable from 0 to 1 for a person with FEAR OF CONFLICT=0 (CONFLICT 1ST CONCERN=0; CONFLICT 2ND CONCERN=0; PEACE AS CONCERN=0; INTEGRITY AS CONCERN=0); controls are fixed at sample means. Standard errors in parentheses. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels.

Table 5: Individual model with alternative dependent variables— probit marginal effects

Control variables	(1)	(2)	(3)	(4)	(5)
FEAR OF CONFLICT	0.122***	0.067**	0.063**	0.044**	0.014
	(0.030)	(0.029)	(0.029)	(0.021)	(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.

Table 6: Individual models by different sub-samples - probit marginal effects

Control variables	(1)	(2)	(3)	(4)	(5)	(6)
FEAR OF CONFLICT	0.149***	0.076*	0.141***	0.103**	0.102**	0.138***
	(0.040)	(0.044)	(0.042)	(0.044)	(0.047)	(0.039)
Baseline controls included	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.080	0.059	0.085	0.065	0.065	0.074
N	824	852	864	812	695	981

Note.— Dependent variable is: SON BIAS. Sample is limited to: males in column (1); females in column (2); 46-80 years-old individuals in column (3); 18-45 years-old individuals in column (4); individuals with at most 10 years of education in column (5) and individuals 11 or more years of education in column (6). 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.

Table 7: Individual model with comprehensive controls

Control variables	(1)	(2)	(3)	(4)	(5)	(6)
	A: Univariate probit estimates					
FEAR OF CONFLICT	0.122***	0.121***	0.119***	0.107***	0.104***	0.108***
	(0.030)	(0.030)	(0.030)	(0.032)	(0.033)	(0.033)
RUSSIAN FLUENT		-0.013	-0.011	-0.027	-0.030	-0.036
		(0.039)	(0.039)	(0.042)	(0.043)	(0.043)
RUSSIAN NATIVE		-0.084	-0.102	-0.108	-0.111	-0.126
		(0.076)	(0.078)	(0.084)	(0.084)	(0.086)
NO OVERSEAS TRIPS			0.010	0.026	0.025	0.028
			(0.029)	(0.032)	(0.032)	(0.032)
RACIAL TOLERANCE			-0.084***	-0.071**	-0.075**	-0.074**
			(0.030)	(0.032)	(0.032)	(0.033)
RELIGIOUS MAJORITY				0.006	0.007	-0.008
				(0.072)	(0.072)	(0.074)
VERY RELIGIOUS				-0.027	-0.024	-0.018
				(0.029)	(0.029)	(0.030)
HAS CLOSE PEOPLE					-0.015	-0.001
					(0.040)	(0.041)
FEELS EMPTINESS					-0.008	-0.002
					(0.029)	(0.029)
DISTRUST IN ARMY						0.038
						(0.034)
Baseline controls included	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.069	0.070	0.074	0.077	0.074	0.074
N	1676	1671	1649	1430	1409	1387
	B: Bivariate probit estimates					
FEAR OF CONFLICT						0.066*
						(0.036)
Comprehensive controls included						Yes
N						1363

Note.— Dependent variable is SON BIAS. Panel A reports the marginal effects for a discrete change of a variable from 0 to 1 for a person with FEAR OF CONFLICT=0. Panel B reports the bivariate predicted probability; controls are fixed at sample means. Standard errors in parentheses. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels. In the bivariate probit model, HISTORY OF FORCED DISPLACEMENT is excluded from the equation of SON BIAS but is included in the equation of FEAR OF CONFLICT with an estimated coefficient of 0.334 significant at 1 percent level.

Table 8: Matching estimations

	(1)	(2)	(3)
FEAR OF CONFLICT	0.093***	0.104**	0.095**
	(0.026)	(0.046)	(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.

Table 9: Community model: Post-ceasefire effects using continuous distance measures

Control variables	(1)	(2)	(3)	(4)
Post=1	8.511***	2.392	12.565***	11.891
	(2.171)	(8.505)	(2.759)	(11.089)
Post=2	9.625***	9.928*	11.338***	15.287*
	(1.901)	(5.338)	(2.471)	(7.820)
Post=3	10.912***	25.808**	11.689***	35.043***
	(2.375)	(10.579)	(2.599)	(11.306)
Post=1 × Distance to Conflict		0.021		0.002
		(0.028)		(0.032)
Post=2 × Distance to Conflict		-0.001		-0.012
		(0.018)		(0.022)
Post=3 × Distance to Conflict		-0.052		-0.071**
		(0.033)		(0.034)
Post=1 × Distance to Capital			-0.040	-0.039
			(0.029)	(0.033)
Post=2 × Distance to Capital			-0.017	-0.022
			(0.017)	(0.021)
Post=3 × Distance to Capital			-0.008	-0.038
			(0.028)	(0.026)
Constant	96.528***	106.042***	106.061***	106.061***
	(1.033)	(0.875)	(0.874)	(0.859)
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. 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 proxy variable for the ease of access to ultrasound technologies. Post=1, Post=2 and Post=3 denote three periods following the ceasefire agreement. Standard errors are clustered at the community level. *Denotes significance at 10 percent; **at 5 percent; ***at 1 percent levels.

Table 10: Community model: Post-ceasefire effects using treatment and control groups

Control variables	(1)	(2)	(3)	(4)
Post=1	8.782***	4.334	2.082	-5.188
	(2.245)	(3.044)	(4.064)	(4.615)
Post=2	9.711***	7.928***	6.965*	-6.944**
	(2.078)	(2.111)	(3.616)	(3.389)
Post=3	7.296***	12.965***	7.452**	-13.307***
	(1.766)	(3.695)	(3.286)	(1.896)
Treat=1 × Post=1	-0.711		3.686	6.453
	(4.020)		(4.405)	(5.870)
Treat=1 × Post=2	-0.233		1.576	6.079
	(3.383)		(4.372)	(4.075)
Treat=1 × Post=3	9.088**		9.021**	15.604***
	(4.511)		(4.325)	(2.207)
Close to Capital =1 × Post=1		7.935**	9.543**	15.153***
		(3.714)	(4.202)	(5.162)
Close to Capital=1 × Post=2		3.194	3.885	16.766***
		(3.271)	(4.241)	(3.718)
Close to Capital=1 × Post=3		-4.204	-0.371	19.226***
		(4.089)	(3.651)	(2.118)
Constant	106.035***	106.070***	106.064***	106.237***
	(0.869)	(0.877)	(0.858)	(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.

Table 11: Community model: Robustness tests

Control variables	(1) w/o outliers	(2) 25th percentile	(3) placebo
Post=1	-3.705	0.091	5.896*
	(4.397)	(3.015)	(3.329)
Post=2	-5.909*	-7.670***	2.641
	(3.300)	(2.254)	(2.559)
Post=3	-13.158***	-15.910***	2.672**
	(1.885)	(1.333)	(1.284)
Treat=1 × Post=1	10.109**		
	(4.930)		
Treat=1 × Post=2	8.632**		
	(3.574)		
Treat=1 × Post=3	15.972***		
	(2.180)		
Close to Capital=1 × Post=1	12.979***		9.037*
	(4.761)		(5.298)
Close to Capital=1 × Post=2	15.247***		7.415**
	(3.534)		(3.597)
Close to Capital=1 × Post=3	19.008***		7.515***
	(2.095)		(2.242)
Treat25=1 × Post=1		4.890	
		(4.757)	
Treat25=1 × Post=2		10.266***	
		(3.436)	
Treat25=1 × Post=3		18.293***	
		(1.823)	
Close to Capital25=1 × Post=1		10.846**	
		(4.764)	
Close to Capital25=1 × Post=2		18.558***	
		(3.357)	
Close to Capital25=1 × Post=3		21.798***	
		(1.793)	
GyumriDist=1 × Post=1			-5.365
			(5.540)
GyumriDist=1 × Post=2			-0.692
			(3.799)
GyumriDist=1 × Post=3			-4.248*
			(2.352)
Constant	105.941***	105.941***	105.941***
	(0.693)	(0.707)	(0.697)
Community time trend	YES	YES	YES
Community FE	YES	YES	YES
Number of communities	74	74	74
Observations	290	290	290

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.