Armed conflict and the timing of childbearing in Azerbaijan

Orsola Torrisi*

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Abstract

Research on fertility changes in formerly Soviet states of the Caucasus is scant and has thus far overlooked the role of armed conflicts. This article contributes to filling these gaps by providing the first detailed account of fertility changes in Azerbaijan since independence and by exploring them in relation to the Nagorno-Karabakh conflict with Armenia. Estimates from retrospective birth history data from the 2006 Demographic and Health Survey show that since 1991 period fertility declined to almost below-replacement levels, essentially as a result of stopping and more recent postponement behaviours. While the conflict seems to have little influence on aggregate trends, discrete-time logit models with random effects reveal a 50-53% higher probability of transitioning to the second birth for women who have been exposed to conflict violence, whether in the form of forced migration or because of residence in the conflict-torn Karabakh region, than non-exposed women. Never-migrant women from Karabakh also have significantly higher probability of having a first child. Further positive effects on fertility are observed for women experiencing child loss during peak conflict years. Replacement and risk-insurance effects are possible mechanisms explaining such fertility responses.

Keywords Fertility · Conflict · Azerbaijan · Post-Soviet

1 Introduction

Armed conflicts represent prominent and recurring challenges for contemporary societies, with nearly two billion people living in areas affected by violence and political instability worldwide (World Bank, 2017). Some of the demographic consequences of conflict violence – mortality and forced migration in particular – receive substantial attention in population studies (Brunborg and Tabeau, 2005) and considerable media coverage. Much less research interest seem to be placed on conflict effects on fertility (D'Aoust and Guha-Sapir, 2010). This is of concern for a variety of reasons. First, in most societies, the family, its composition and functioning are still fundamental to individuals' perception of life quality and wellbeing (Alesina and Giuliano, 2010; Pichler, 2006). This centrality is especially true for those living in conditions of protracted physical, political, and economic insecurity and violence, where the family represents the basic unit of subsistence and is likely to be a key element in individuals' coping strategies (Justino, 2011). Evidently, addressing how the family domain and household childbearing decisions are influenced by situations of violence and insecurity is crucial to ensure and promote individual and community resilience. Second, lack of focus on fertility highlights gaps in our understanding of the difference in vulnerability between women and men in conflict settings. Although men are typically more likely to suffer the direct consequences of

*Department of Social Policy, London School of Economics (email: o.torrisi@lse.ac.uk).

conflict, women face more insidious challenges and often endure more heavily the burden of diminishing family resources (Ghobarah et al., 2003; McKay, 1998; Plümper and Neumayer, 2006). For instance, in times of crises impoverished families may prefer to interrupt education of their young childless women to marry them as a way of smoothing consumption and securing access to alternative means of sustenance (Shemyakina, 2011, 2013). In contexts where marriage and childbearing are strongly associated, similar stimuli to marriage are likely to "open the doors" to early childbearing (Khawaja and Randall, 2006), which is commonly associated with various negative health outcomes (Nour, 2006), educational and socio-economic disadvantage (UNICEF, 2005). Thus, examining the contribution of conflict to changes in fertility can shed light on the female condition, status and bargaining power in the household and has implications for post-conflict development and gender equality. Knowledge on how fertility decisions are made during conflict is needed to advance our theoretical understanding of the contributors and drivers of contemporary long-term population change, as well as to inform family planning, health and education strategies in conflict-ridden and post-conflict settings where these policy decisions, and often the institutions setting them, may have to be created from scratch.

Scarcity of research on the conflict-fertility nexus is particularly visible in the ex-Soviet space. This should not come as a surprise as the USSR dissolution is still widely regarded as a "uniquely peaceful geopolitical catastrophe" (Baev, 2007, p.250). In reality, its demise created peripheral disaster zones where turbulent chaos and decentralised violence soon emerged (Broers, 2016). This is the case of Azerbaijan, a country historically located at the cross-roads of territorial struggles between Persian, Ottoman and Russian empires, which has been embroiled since 1991 in a deadly inter-state war with its neighbour Armenia over the Nagorno-Karabakh region. Furthermore, while a number of studies have investigated fertility changes in post-Soviet Central and Eastern Europe (Billingsley, 2010; Kohler and Kohler, 2002; Kotowska et al., 2008; Macura and MacDonald, 2003; Perelli-Harris, 2005; Sobotka, 2004; Sobotka et al., 2003), and Central Asian republics (Agadjanian et al., 2008, 2013; Agadjanian and Makarova, 2003; Clifford et al., 2010; Spoorenberg, 2013, 2015), the fertility trajectories of countries in the Caucasus remain largely undocumented. To date, no study has investigated the fertility dynamics of independent Azerbaijan and assessed the factors, including conflict, that might have contributed to changing fertility trends and patterns in the country's early and late post-Soviet period.

This article seeks to fill these gaps. Using birth history data from the 2006 Azerbaijan Demographic and Health Survey (A-DHS), I complement existing research on post-Soviet fertility changes by retracing and describing for the first time the nature of historical developments in aggregate, age- and parity-specific fertility trends in Azerbaijan. This is essential to determine the country's current stage in the fertility transition, how fertility trends have changed over time, their driving factors and whether such changes are related in time with conflict hostilities. The study then moves to expand our knowledge on the conflict-fertility relationship and employs discrete-time logit models with random effects to investigate how exposure to conflict violence specifically correlates with the transitions to first, second and third birth.

From a theoretical standpoint, the outcomes are ambiguous: individuals may accelerate childbearing transitions for security, consumption-smoothing, as a result of nationalist pronatalist drives or other indirect reasons; equally, they may postpone them in hope of better times or because of quality/quantity trade-offs. Existing evidence is also inconclusive, possibly because different types of conflict – e.g. inter-state versus intra-state violence – trigger diverse fertility responses (Cetorelli, 2014; Neal et al., 2016). For this reason, although often treated as marginal, reflecting on the actors involved is important in the formulation of hypotheses about family formation responses to conflict. This article will thus contribute to these theo-

retical debates by providing evidence from a neglected conflict zone, where the interplay between ethnic and political drives as well as the emergence of nationalist ideologies and sentiments against the external 'enemy' might have translated into higher fertility among the conflict-exposed. Furthermore, by looking at subsequent transitions, the study seeks to extend extant research, which has so far mainly looked at overall fertility and aggregate trends, thereby implicitly neglecting that conflict effects on childbearing decisions are likely to differ by parity depending on the stage of the fertility transition the affected country is undergoing.

Analysing fertility responses to conflict violence is consequential for policy-making: for instance, evidence of higher fertility in conflict-affected households would require scaling up the resources for maternal and new-born health as well as family planning services devoted to such subgroups. Similarly, it may flag cohort-size effects, which, if not addressed with prompt responses, might trigger additional social distress and frustration in already vulnerable groups, especially in the labour market and marriage system (Urdal, 2006). Hence, the results of this study serve as important inputs for the design of strategies targeting women, children and fragile populations such as refugees and internally displaced (IDPs) in Azerbaijan as well as for prevention policy strategies in conflict-prone areas with similar historical past, like Dagestan and Donbass.

The paper is organised as follows. First, I discuss the literature guiding the study – including theory on the conflict/fertility nexus and existing evidence on fertility changes in the post-Soviet space – and introduce the study context to inform my expectations about fertility changes and responses to conflict in Azerbaijan. Next, I describe the data and analytical strategies used in the analyses. Estimates of the total fertility rate (TFR), parity- and age-specific fertility rates since Azerbaijan's independence, and the results of statistical models are then presented and discussed with reference to Azerbaijan's institutional and historical context, to population developments in the larger ex-Soviet sphere and to other conflict-torn settings. The policy implications of the findings and steps for future research output are also considered.

2 Background

The conflict and fertility relationship

As Randall argues, "conflict is part of the human condition and therefore should be integral to all analyses and interpretation of demographic behaviour" (2005, p.292). Although research on the demographic consequences of armed conflict has grown substantially, it still concentrates on their direct effects, e.g. excess mortality, migration and displacement[1]. The empirical question of how conflict violence affects fertility has not attracted comparable attention, though the disproportionate long-term effects of civil unrest on women and the centrality of family support in hard times are well-known (Austin et al., 2008; Ghobarah et al., 2003; Patel et al., 2016).

Most accounts of the relationship between conflict and fertility are historical studies of the impacts of the World Wars on Western Europe childbearing patterns. These typically document a 'pro-cyclical' relationship, whereby wartime fertility drops are followed by post-war compensatory "baby booms" (Hobcraft, 1996; Rindfuss and Sweet, 2006). Experiences of conflict-related fertility declines have been documented in some low- and middle-income countries during the 1990s. In Central Asia, Clifford et al. (2010) noted period declines during the Tajik civil conflict. Yet, the authors contended that the drop was more the result of fallacious vital registration than of a real decline due to conflict. Lindstrom and Berhanu (1999) detected short-term declines in conceptions in Ethiopia during years of military unrest, with the caveat

that this period also coincided with crop failures and drought, making it hard to disentangle the effect of each disruptive event. The Rwandan genocide was associated with postponement of first birth (Jayaraman et al., 2009), although only in the short-term (Schindler and Brück, 2019). Temporary declines were also observed in Cambodia (De Walque, 2006), Angola (Agadjanian and Prata, 2002), in Sarajevo during the Bosnian war (Hill, 2004) and in Eritrea (Woldemicael, 2008).

While most evidence suggests 'disruptive' effects of conflict on fertility, at least in the short-term, compelling reasons exist to expect the opposite (Van Bergen, 2010). Evidence supporting the 'fertility promotion' hypothesis comes from Middle Eastern and sub-Saharan African countries (see for instance Abbasi-Shavazi et al. (2009) for Iran; Cetorelli (2014) for Iraq; Yüceşahin and Özgür (2008) for Kurdish populations in south-eastern Turkey; Khawaja and Randall (2006) for the Occupied Palestinian Territories; Schindler and Brück (2019) and Kraehnert et al. (2019) for Rwanda) and, more recently, also from Latin America (Castro Torres and Urdinola, 2019). Nonetheless, although peaks and troughs in reproductive patterns in conflict settings seem to be common, in few cases fertility remained unresponsive to conflict violence (Ladier-Fouladi and Hourcade, 1997; Saxena et al., 2004).

The existing studies reveal the complexity of fertility responses to civil unrest and pinpoint to different *direct* and *indirect* mechanisms eliciting them. With regards to the former, economic explanations based on Becker's 'quantity-quality' framework (Becker and Lewis, 1973) suggest that conflict-induced hardship increases couple's awareness of the costs associated to each additional child and the advantages of having fewer mouths to feed, thereby leading to conscious efforts to delay or reduce childbearing. Similarly, spousal separation, population displacement and conscription can directly depress fertility (Hill, 2004; Lindstrom and Berhanu, 1999). On the other side of the spectrum, the 'risk-insurance' approach to fertility suggests that under conditions of generalised instability and economic dislocation, replacement fertility operates as a direct intentional coping strategy for households to preserve or increase their sources of income and to compensate for the potential loss of already-born children (Verwimp and van Bavel, 2005).

Indirect mechanisms relate more to psychological and biological factors. For instance, conflict-induced stress and impairment can have unintended disruptive effects on fecundity, reduce the frequency of intercourse, thus lowering overall fertility (Palloni et al., 1996). Similarly, the detrimental consequences conflict has on community infrastructures, e.g. roads, water systems, health facilities, can impact the organisation of food supply (Van Herp et al., 2003). Women's ensuing worsened nutritional status can then too have indirect disruptive effects on fertility. On the other side, it is also possible, as proposed by the psychology literature and 'attachment theory', that during periods of heightened stress individual stronger search for emotional and physical support from loved ones increases frequency of intercourse and thus, indirectly, fertility (Cohan and Cole, 2002). Childbearing may also be a way to "normalise" one's life in the face of traumatic events (Carta et al., 2012). Other indirect factors, e.g. gender-related violence like war-rapes, the breakdown of community institutions, family planning services and disruption of health systems can also contribute to fertility increases (Tabeau and Bijak, 2005). Lastly, but importantly in long-lasting inter-state conflicts, nationalist sentiments and the perceived need to maintain a demographic balance with the opposing group can culminate into pronatalist feelings or even population policies encouraging childbearing (Abbasi-Shavazi et al., 2009; Fargues, 2000). Overall, such mixed evidence on the conflict-fertility relationship agrees with Sillanpaa's 2002 view that the demographic impact of armed conflicts varies according to the severity and duration of hostilities, and may indicate that differential responses may emerge at different stages of the fertility transition.

Post-Soviet transitions and fertility changes

To date, limited evidence on the conflict/fertility relationship has come from formerly Soviet countries and no study has assessed changes in fertility that might have occurred in conjunction with armed violence, including the Nagorno-Karabakh conflict in Azerbaijan. More generally, fertility trends and patterns in post-independence Azerbaijan have been largely overlooked. By contrast, extended literature has documented the fertility declines that came about following the USSR collapse in ex-communist countries of Central and Eastern Europe, in some Commonwealth Independent States (Billingsley, 2010; Kohler and Kohler, 2002; Kotowska et al., 2008; Macura and MacDonald, 2003; Perelli-Harris, 2005; Sobotka, 2004; Sobotka et al., 2003) and in Central Asian republics (Agadjanian et al., 2008, 2013; Agadjanian and Makarova, 2003; Clifford et al., 2010; Spoorenberg, 2013, 2015). This body of literature showed that although the decline was a common pattern across the entire ex-Soviet space, the nature of the changes differed by region.

In Central Europe[2], where the economic and political transitions had been less traumatic, the decline resulted out primarily from timing effects (Sobotka, 2004), i.e. raising mean age of first birth. This *'starting-later'* pattern has been attributed primarily to ideational shifts favouring the adoption of "Western" reproductive and family models, including secularisation, increased individualism and female autonomy (Kotowska et al., 2008; Rabusic, 2001; Spéder, 2006). Conversely, South-Eastern Europe[3], Slavic Central European countries[4] and Central Asian states[5] floundered in social and structural economic problems, which prevented such ideological shifts. Here, economic impoverishment and breeding uncertainty triggered quantum effects and a *'stopping-sooner'* behaviour (Agadjanian et al., 2008; Agadjanian and Makarova, 2003; Clifford et al., 2010; Gjonca et al., 2008; Perelli-Harris, 2005; Shakhotska, 2011; Sobotka, 2004; Spoorenberg, 2009), leading to birth limitation at high parities and to an increasing proportion of one-child families. The one study on a country in the Caucasus region, Armenia, suggests some parallels with this latter type of response (Billingsley, 2011).

Post-Soviet Azerbaijan: socio-economic changes and the conflict with Armenia

As in this latter group of countries, Azerbaijan's early transition period was tumultuous. Economic anomie, trade disruption and political dislocation led to the crumbling of the economy (Cornell, 2017). In the 5 years between 1990 and 1995, hyperinflation caused recorded real wages to decline by 86% and per-capita GDP bottomed at USD 173 (Singh and Laurila, 2011). The loss of the Russian market – to which Azerbaijan exported much of its agricultural output – as well as reductions in subsidies curtailed one of the country's most important employment sectors (World Bank, 2005). All of this was accompanied by structural and institutionalised corruption, in which Azerbaijan was already a "leader" during the Soviet era (Clark, 1993). However, differently from most other former constituent parts of the USSR, in Azerbaijan the path to regime change and restructured economy was further complicated by a violent struggle for power and space. For its entire post-independence period, Azerbaijan has been at war with its neighbour Armenia over the Nagorno-Karabakh region (Baev, 2007), a landlocked territory internationally recognised as belonging to Azerbaijan (OSCE, 2008; UN General Assembly, 2008), but which Armenia claims to be an historically Armenian site of residence (Cornell, 2001).

Inter-ethnic tensions between Azerbaijanis and Armenians surfaced in 1987, with corresponding nationalists perpetrating occasional acts of violence against each other. However, although disagreement exists between respective sources on the exact start of the hostilities, most analysts and official sources indicate late 1991[6] as the beginning of the full-scale war and recognise 1992-1994 as the peak years of hostilities (Cornell, 2015;

Hopmann and Zartman, 2010; Huseynov, 2010), when most conflict events occurred (Figure 1). Among the most traumatic events of the conflict was the 1992 Khojali massacre, an Armenian attack on the Azerbaijani-populated town of Khojali, which caused an estimated 400-600 deaths in one day (De Waal, 2004; Goltz, 2015; Huge, 1992; Lieven A., 1992). Armenians later occupied Shusha, the major city of the Karabakh region, the neighbouring district of Lachin and parts of other Azerbaijani districts adjacent to Nagorno-Karabakh[7]. In May 1994, the opposing parties signed an armistice agreement which led to the creation of a de facto Republic of Karabakh, with strong links to Armenia. Since then, though, negotiations have been stalling and a number of ceasefire violations have been registered.

- Figure 1 about here -

The conflict has caused a massive loss of human life, estimated between 17.000–25.000 (Commission on Security and Cooperation in Europe and Washington (CSCE), 2017; Cornell, 2015; De Waal, 2004; UCDP-GED, 2018; Yunusov, 2002). The scale of forced displacement was even larger. Between 750.000-1.000.000 Azerbaijanis were uprooted from Armenia and Nagorno-Karabakh (Cornell, 2015; De Waal, 2004; Yunusov, 2002) and forcibly displaced within Azerbaijan. Such a large refugee/IDP flow – about 10 to 15% of the country's total population of 8 million – generated enormous social stress which endures today. For many years, Azerbaijan has been the country with the largest per capita number of IDPs in its national population (Greenway, 2009) and, although the last official refugee/IDP camp was closed in 2007, as late as 2016, one in 15 Azerbaijanis was still a refugee/IDP (UNHCR, 2017).

Whilst the territorial dispute over Karabakh is often defined as a "frozen conflict" (Broers, 2016), the sheer scale of suffering and scars it produced are still visible in today's Azerbaijan. Recent years have seen a worrisome increasing trend in conflict incidents (Figure 1) as well as in the number of casualties[8] (UCDP-GED, 2018; US Department of State, 2016). This highlights that similar unresolved security vacuums in the region are by no means frozen (Cornell, 2015); rather, they continue to cause uncertainty and fuel nationalist sentiments, which might associate with childbearing decisions overtime.

3 Data and measures

Complete vital registration would be best to assess the effects of conflict on demographic processes. However, armed conflicts often occur in countries with poor registration systems. Alternatively, when these exist, violence often hinders their proper functioning. As in other parts of the former Soviet bloc, vital registration systems in Azerbaijan have been affected by issues of underreporting of births, particularly of females, due to registration depending on citizens' initiative, discrepancies in international/Soviet definitions of "live birth" and fees for registration (Anderson and Silver, 1989; Jones and Grupp, 1987). These problems are likely to have been particularly acute during conflict years.

When official civil registries are flawed, data from nationally representative surveys can be used to reconstruct fertility patterns and analyse their components (Cetorelli, 2014; Clifford et al., 2010; Woldemicael, 2008). Variables extracted from surveys can further be used to go beyond demographic description of trends and test empirical associations. Accordingly, this study uses birth history data from the A-DHS, implemented in Azerbaijan between July and November 2006. The survey collected data on key indicators of social development, including fertility histories, health and aspects of household welfare from a nationally representative sample of 8,444 women aged 15–49 years[9], with an overall response rate of 98%.

The survey sample was generated in two stages. First, clusters were selected in Baku and in eight other economic regions from the 1999 Population Census sample frame. In the second stage, households were listed in each cluster and systematically selected[10,11]. It is important to note that due to security reasons the survey covered only selected areas of the Karabakh region (Agdam and Terter regions, and part of the Fizuli region) and did not include Nakhchivan and the Kelbajar-Lachin districts as under Armenian occupation. Figure 2 shows such areas along with geo-referenced data on the number of conflict events occurred between 1991–2018 from the Uppsala Conflict Data Program Georeferenced Event Dataset (UCDP-GED).

- Figure 2 about here -

Despite this limitation, the A-DHS household questionnaire asked to all members aged 16+ about their IDP or refugee status. If the individual self-defined as either refugee or IDP, the survey also asked about his/her previous district or country of residence. This allows identifying household and women who have not only been affected by the conflict – whether in Armenia or in the Nagorno-Karabakh territories – but also those who experienced forced displacement. I thus constructed two different conflict exposure variables based on a 'narrow' and a 'broad' definition of conflict exposure. The former defines as *exposed* to conflict violence women who (i) always resided in the Karabakh region and (ii) women who self-identify as refugees from Armenia/IDPs from Nagorno-Karabakh. The latter further includes (iii) women who were not refugees or IDPs, but whose husbands were. This is because, childbearing decision-making has been shown to be the result of an interaction process between the individual preferences of each partner, and thus a choice jointly taken at the household-level (Stein et al., 2014). Although women are the main actors and reporters of childbearing events, in a patriarchal society Azerbaijan, limiting the measure to women's conflict status only may not fully capture the influence of conflict on fertility decision-making.

Table 1 presents the key background characteristics of samples of ever-married women in Azerbaijan by conflict status used in the statistical analyses[12]. Despite diverse experiences of violence, more and less conflict-exposed groups do not appear to largely differ in their fertility-related characteristics. For instance, both more and less conflict-affected women report similar averages of children ever born (about 2.27 per woman), except those residing in the Karabakh region, who have modestly higher fertility levels (2.41 ever-born children per woman). Similarly, no marked differences emerge across differently affected groups in terms of age at marriage, first and subsequent births, although less exposed women appear to marry and have the first two births slightly earlier (but not significantly so) than their more exposed counterparts. The groups, instead, show more diverging profiles when it comes to socio-economic variables. Conflict exposed women are significantly more urbanised than the less exposed, IDP and refugees especially. By contrast, residents in the Karabakh region are disproportionately more rural. This is not unexpected as according to official data collected around the time of and some after the implementation of the 2006 A-DHS, around 70% of IDPs and refugees in Azerbaijan reside in urban areas or peri-urban settings (World Bank, 2010, 2018), where camps were more readily available and services for such population groups more easily accessible at the time of harsh conflict hostilities. The education differentials among the groups are also noteworthy. While the least educated group is, predictably, the Karabakh residents, the differences with the less exposed is not large and the most educated appear to be IDP/refugees. Nonetheless, differences are not statistically significant. Furthermore, the Soviet legacy of high literacy is visible across all subgroups, with only 2% of women in the overall sample reporting not having completed primary schooling.

- Table 1 about here -

Taken alone, Table 1 seems to suggest only modest conflict-related differences in socio-economic and fertility background. However, these numbers are simple sample statistics which, despite being useful, have limited informative power. The next section thus presents the methods and analytical strategies used to investigate more in detail fertility trends and their relationship with armed conflict in Azerbaijan.

4 Methods

The first aim of this study is to retrace Azerbaijan's fertility history and understand the mechanisms driving changes, e.g. whether they conform more to a 'stopping-sooner' or a 'starting-later' behaviour. Data from the A-DHS can be used to reconstruct annual fertility rates for the 15 years before the survey (Schoumaker, 2013). For a woman aged x[13] in calendar year t, the fertility rate is:

$$F_{x,t} = \frac{B_{x,t}}{W_{x,t}}$$

where $B_{x,t}$ represents the number of births in year t to women aged x and $W_{x,t}$ is the exposure to risk of giving a birth at age x during year t calculated in women-years. Standard errors, derived using the delta method, are then used to compute the 95% confidence intervals for $F_{x,t}$ (Pullum, 2006; Schoumaker, 2013). Estimates are calculated for all women and for conflict-affected versus less affected women. Next, to understand the nature of fertility changes, I calculate period parity-specific changes using parity progression ratios (PPRs). This measure presents the proportion of women who have j child(ren) in the years preceding the index year and go on (or "progress") to have j+1 child(ren) in the index year (Hinde, 1998). PPRs are constructed using the synthetic cohort method (SCM) (Ní Bhrolcháin, 1987)[14]. It is important to note that the risk of selection due to censoring inherent to the SCM is here minimised as changes in this incremental aspect of childbearing are explored over a relatively limited time frame – i.e. 1990–2006.

The second aim of the paper is to investigate how conflict exposure may be associated with changes in fertility, and in particular with the transition to the first, second and third birth. To do so, I use an event-history approach which allows establishing general and conflict-specific trends in the outcomes of interest overtime. Specifically, the model chosen to analyse the three transitions is a discrete-time logit model with random effects at the woman-level. In its general form, the model can be expressed as:

$$log\left(\frac{\pi_{t,i}}{1-\pi_{t,i}}\right) = \alpha D_{ti} + \beta X_i + \gamma P_{ti} + \upsilon_i$$

Where, π_{ti} is the probability for woman i of experiencing the event during interval t. D_{ti} is a vector of functions of the cumulative duration by interval t with coefficients α. This is specified using a step function and it is broken into k categories (e.g. <2 years, 3-6 years and so on) during which the risk of the outcome of interest is assumed constant for women with the same pattern of covariates. Time is measured in years as common in fertility analyses. The choice of this time scale (years instead of months) is also guided by the fact that interest lies in the effect of macro-level political changes which, even in rapidly-transforming conflict settings like independent Azerbaijan, unfold gradually over time (Agadjanian et al., 2008). X_i is a set of time-invariant individual-level covariates with coefficients β and P_{ti} is a vector of dummy variables representing calendar year effects. These latter are time-varying since women are exposed differently to historical periods as they move forward through the risk of giving birth. The main predictors of interest are thus calendar year, the conflict exposure variable (in its 'broad' definition as explained above) and, for second and third birth, experience of child death during key conflict years (1992-1995). This latter predictor

is coded as a dummy variable where 1 indicates that the previous child died during conflict years and before the birth of the i^{th} child under study to make sure that the events are in the correct chronological order. Other variables included in the X_i vector are age at marriage specified as linear and quadratic (age at second and third birth for following births), residence type (urban or rural), and education. This latter is constructed as a 3-level variable following Agadjanian et al. (2008) and reflecting the Soviet educational system: general secondary or lower; vocational, alternatively known as specialised secondary (*tehnikum* in Russian), and higher. In the second and third birth models, I further add sex of the previous child(/ren) in order to account for possible sex selective practices, which are known to be widespread in Azerbaijan (Yüksel-Kaptanoğlu et al., 2014).

Lastly, υ_i are the woman-specific random effects which account for unobserved heterogeneity attributable to individual time-invariant unknown risk factors. For each individual, υ_i represents a set of unmeasured characteristics randomly drawn from a normal distribution with variance σ_υ^2 (Steele, 2008)[15]. This is interpreted as the residual variance between women that is due to unmeasured time-invariant attributes. Including woman-specific random effects in the study of transitions to the i^{th} birth is important because omitting some unobservable variables[16] or simply ignoring the heterogeneity existing in women's biological capacity of conceiving, can lead to a dynamic selection process that may produce incorrect hazard estimates and a misleading impression of duration dependence (Jenkins, 1995). In the case of transitions to the next birth, this is because women have different childbearing intensities: those with high intensities (i.e. those whose unobserved characteristics make them at "high-risk") have shorter durations and are selected out of the sample, leaving those with low intensities ("low-risk") behind. This in turn implies that at higher duration, the sample at risk is increasingly composed of women whose unobservable characteristics make them unlikely to experience the event of interest and thus more "robust" against childbearing than the rest. Random effects are therefore included to avoid the emergence of such model specification issues.

Given that childbearing outside wedlock is particularly rare in Azerbaijan, women aged 16+[17] are observed from their date of marriage until the date of first birth or interview for the first transition[18], whichever comes first. Those who gave birth before entering into official union are thus excluded from the analyses (1.4%, n=80). For second and third births, exposure starts 5 months after the previous birth to allow for the effects of lactational amenorrhoea. Women who have not experienced these events at interview time are right-censored.

As robustness checks, the paper also explores differences in transition to birth by using the 'narrow' definition of conflict and by separating out the effects of being a refugee/IDP and a Karabakh resident. Finally, it is important to note that all the estimates reported in this paper are based on a sample of survivors residing in Azerbaijan in 2006. Those who died during the conflict or migrated outside the country are therefore excluded. Most of movements of the Azerbaijani titular population occurring during conflict years were internal to Azerbaijan, predominantly in the form of displacement. International migration concerned more the emigration of Russians in the post-independence years and of Armenians (Aliyev, 2006). Hence, as interest lies in the titular population, outward migration should not represent a major issue.

5 Retracing fertility trends in post-independence Azerbaijan

Figure 3 displays trends in TFR in Azerbaijan from independence to 2005 as estimated from the A-DHS and compared with official estimates from vital registration[19]. In general, both sources provide considerable evidence of period fertility decline since independence in 1991, although estimates converge only at the start

of the new century, suggesting underregistration of birth in the post-independence and conflict years. A small, but noteworthy opposite mismatch between survey estimates and vital registration appears in the last years of observation, with the latter reporting higher fertility than survey estimates. This seems to be due to increased fertility rates in women aged 35–49 between 2003 and 2005[20], whose fertility is only partially captured by estimates calculated retrospectively from the A-DHS (see Figure 6). Overall, the number of children per woman moved from above 3 in 1992 (as estimated from the A-DHS) to below replacement at the start of the new century (1.75 in 2001, 95% CI 1.56–1.93) with then TFR plateauing around 2 children per woman in the most recent years. The decline seems to be most evident between 1993–1996, reflecting lower conceptions during years marked by conflict and economic dislocation.

- Figure 3 about here -

PPRs, presented in Figure 4 using 3-year moving averages to smooth annual fluctuations[21], show that the drop in fertility was primarily the result of declines in third-order fertility and, only a decade after the fall of the USSR and onset of the Karabakh conflict, to incipient delayed fertility. In detail, the proportion of women who moved from having no to one child after marriage remained practically unchanged during the conflict period and only showed small signs of postponement at the beginning of the new century. Similarly, the proportion of women who continued to have a second birth remained more or less constant over the 1990s and early 2000s, with some decline during conflict-years. Third order progression instead was characterised by a more substantial drop: the proportion of women transitioning to the third parity almost halved between the early independence years and 2005. Falls occurred in all years, although most of the decline in progression to the third birth can be observed from 1992 to 1996 (conflict years) and again from 1999 to 2002. This therefore suggests that the major characterising force for fertility declines in Azerbaijan was that of a 'stopping-sooner' behaviour associated, at least initially, with years of deteriorating economic conditions and conflict violence. Further, given that at least until 2002 virtually all women in Azerbaijan had a first birth after marriage (at least 92%), this sets up parity two as the key birth-decision in this context.

- Figure 4 about here -

To explore more in detail whether conflict violence had any effect on fertility, I estimated TFR from the A-DHS for exposed and less exposed women. As shown in Figure 5, the decline in fertility during peak conflict years is more visible for exposed women and extends to 1997, when TFR point estimate dips below below the replacement level for the conflict-exposed. Notably, in the conflict-exposed group, the decline occurred predominantly among adolescents and young adult women (Figure 6). For instance, fertility dropped from about 190 children per 1,000 women aged 20–24 in 1992 to 108 in 1995. Conversely, fertility declined more visibly in older age-groups for the less affected, suggesting age-related differential responses to violence. The decline in TFR for the exposed is then followed by a recuperation, limited to 1998, the year of the armistice, and then by fluctuations with the lowest total fertility value registered in 2001 for both groups. More recently, compensatory rises are evident among the exposed and, especially, for women in older-age categories. Nonetheless, confidence intervals for the two groups overlap in all years, indicating no significant differences in total fertility during the studied period.

- Figures 5 and 6 about here -

6 Armed conflict and childbearing transitions

The previous section showed that since 1991 Azerbaijan experienced a fertility decline at the aggregate level, engineered predominantly via a 'stopping-sooner' behaviour at parity three, thereby making households' decisions on the second birth very important in this context. Aggregate measures of fertility computed for long periods of time though may not be robust enough to detect the underlying trend of the decline or to fully capture the effects of conflict at different birth orders.

Table 2 thus summarises the main results of the multivariate discrete-time logit models with random effects for all transitions for three groups: the all-women sample (Panel A), the conflict-exposed women (Panel B) and the less exposed women (Panel C), defined as per the 'broad' definition of conflict exposure.[22] Each transition is discussed separately in the following subsections.

- Table 2 about here -

Transition from marriage to first birth

The analysis starts by presenting the odd ratios for the transition to the first birth after marriage. Results from the all-women sample model (Column 1, Panel A) indicate that, although the risk of having a first birth after marriage in any given year is about 10% higher for women exposed to conflict, the difference with non-exposed women is not statistically significant. Here, as well as in the other two Panels, the only significant association with the included covariates is observed with age at marriage, and its effect appears curvilinear: the odds of experiencing a first birth increase substantially to then decline as marital age increases. Place of residence or education have no or very mild associations with the risk of first birth, providing evidence of the universality of motherhood.

As expected from populations where the fertility transition is realised via reductions at high parities, models (see Table 3 in Appendix A) show little variation in the risk of a first birth across calendar years relative to 1991 – the year of independence – and, thus, during years of social turbulence. Although the all-women sample model indicates a statistically visible difference between 1991 and the periods before 1982, no other notable difference is evident in the following decade in all the three groups. Only around 2000 there is a significant decline in risk compared to the independence year, but this is true only for less exposed women and suggests that at least until the start of the new century, transitioning to first birth was still a universal phenomenon in Azerbaijan, particularly among women hit by conflict violence.

- Figure 7 about here -

To better visualise and grasp these long-term trends, Figure 7 presents annual predicted probability for the transition to the first birth for the three groups. Curves are smoothed as 3-year moving averages[23]. A relatively increasing trend in the probability of a first birth can be noted in all three groups throughout the 1980s. For the less exposed, a sizeable downward trend signalling postponement is apparent only around the end of the 1990s, with evidence of stabilisation at the end of the studied period. The more exposed, by contrast, have much more herratic trends: the probability of having a first birth dropped markedly around the twilight of the Soviet period, followed by peaks during key conflict years, and fluctuations in the next decade. By the end of the observation period probabilities of a first birth for the more exposed are very similar to those observed in the early 1980s. In contrast, these declined for the less exposed, thereby shriking the gap between the two groups.

Transition from first to second birth

Column 2 in Table 2 presents the main odds ratios from models predicting the transition from a first to a second birth for the all-women sample, for exposed and less exposed women separately. An overall time-independent conflict-exposure difference in the probability of a second birth is visible and is statistically significant in the all-women sample model (Panel A). In particular, for women with the same unobserved characteristics, the odds of experiencing a second birth are 51% higher for respondents exposed to violence than for those who were not directly affected by the Nagorno-Karabakh conflict. This effect remains stable and significant when controlling for regional differences in fertility[24]. Furthermore, all things equal, the odds of transitioning to a second birth are about 2.48 times higher if women experienced child death during key conflict years. When models are estimated for more and less exposed women individually, we observe that the loss of a child during conflict years significantly and substantially affected the probability of having a second birth (about 5.3 times higher) in the group of exposed women only.

Differently from the transition to first birth, significant declines in the probability of a second birth are visible in the Azerbaijani population as a whole soon after independence (see Table 4 in Appendix A). The pre-independence years all show no clear trend relative to 1991, with a nonsignificant rise in 1987, which possibly reflects the effects of pronatalist Soviet policies introduced in the early 1980s. Then, in each year following independence, the odds of transitioning to the second birth drop significantly. However, the conflict-specific models show that the drop in second birth probability compared to 1991 was only significant among the less exposed to violence. In contrast, a 53% increase in risk was observed for the more exposed in 1992, reflecting higher conceptions and births at the beginning of the full-scale conflict. To better highlight these temporal patterns by conflict exposure, Figure 8 graphically presents predicted probabilities estimated from all models in Table 4. First, the smoothed 3-year moving averages show predicted probabilities that are higher at any time point for more exposed women. The gap with the less exposed increases somewhat around the early stages of the conflict (1987 onwards). Second, although both groups experienced a general downward trend since independence, the decline has been smoother and essentially continuous for less exposed. In the post-truce years (1994 onwards), the pattern for conflict-exposed women fluctuated much more with large declines followed by new rises in the early years of the 21st century.

- Figure 8 about here -

As for other covariates, there are significant positive associations between low education and the probability of progressing to a second birth, except for more exposed women, whilst the relationship is negative when it comes to age at first birth. Rural background is a strong predictor in all models, increasing the risk of second birth by 65%. The sex of the first child is another important covariate influencing the propensity to have a second child in Azerbaijan, with 15% higher risk in household whose first child was a female. Yet, such effect is only visible among less affected women (see Table 4 in Appendix A).

Transition from second to third birth

The main results for analyses on the transition to third birth are reported in Column 3 of Table 2. As for the first birth, the propensity of having a third birth does not seem to be affected by exposure to conflict violence at any time point. However, results show that the risk is 8-fold for women who reported experience of child death during conflict years, the second proxy used to assess exposure to traumatic conflict-related events. The effect of losing a child during conflict years is strong across all the three groups, but is larger in magnitude for women exposed to conflict. Although this is likely to be due to the limited number of second

child deaths occurred in the conflict period (less than 2%), it could suggest replacement and risk-insurance effects even in contexts where declines in high-order fertility are the predominant way to engineer the fertility transition. As observed for the transition to second child, younger age at previous birth, rural residence, low education, and sex composition of the household are all significantly and positively associated with the probability of having a third birth in the Azerbaijani population as a whole and in the less exposed group. Conversely, none of these variables correlates with the risk of transitioning to the third child for exposed women (see Table 5 in Appendix A).

- Figure 9 about here -

Different temporal trends are also visible across the three groups (Figure 9). The probability of a third birth declined well before independence and the conflict with Armenia in the population of Azerbaijan as a whole, but also in the two conflict subpopulations. The drop was much more marked in the more exposed group as their probability was on the rise and nonetheless way higher than that of the less exposed in the early 1980s. The downward trend levelled-off over conflict years with no significant period differences compared to 1991 in all groups, except in the key conflict year of 1992 for exposed women, when there was a marginally significant, but large increase in risk (see Table 5 in Appendix A). Third birth probability dropped again towards the end of the observation period. Interestingly, this 'stopping-sooner'-type of behaviour is only significant in the less exposed population, though the gap between the two conflict-groups practically closed in the early 2000s.

7 Alternative measures and robustness checks

To further explore the strenght of the above results, I estimate the all-women sample model for all the three transitions using the alternative 'narrow' definition of conflict exposure. Results remain practically unchanged when only women who were directly affected by conflict violence are included in the models as 'exposed'.[25]

A dichotomous identification of conflict exposure easily provides information on the association with the transition of interest. However, a binary measure of this kind may mask different responses within groups that have been diversely affected by conflict violence. For instance, women who reside in the conflict-affected region of Karabakh and who, thus, decided not to migrate, may have different fertility responses than refugees or IDP women, who experienced the stress of forced migration, but may have also relocated in more secure zones, farther away from core conflict areas. For this reason, models for all the three transitions were estimated by disaggregated conflict status, i.e. for less exposed women, women who have always resided in the Karabakh region and for IDP/refugee women who had to migrate due to conflict. Tables 6, 7 and 8 in Appendix A report the results for the three transitions.

The estimated odds ratios suggest that indeed different behaviours have been at play across different conflict subgroups. As it already emerged in previous models, the probability of a second birth is much higher (between 50-53% higher) for the conflict groups as compared to the less exposed population. Although replacement effects for children died during conflict years are only visible in the IDP/refugee subgroup, the effect of particularly tumultuous years (e.g. 1992) on the transition to second birth is evident in both refugee/IDP and Karabakh residents. Again, similar to models using a dichotomous definition of conflict exposure, the probability of transitioning to the third child does not differ between different conflict subgroups and the less affected population, but the effect of the 1992 calendar year is visible for IDP/refugees.

Notably and differently from before, the odds of having a first birth are significantly higher (about 44%) for women living in the Karabakh region compared to less-affected women. For IDP or refugee women such risk at any given time is not different from that of the non-exposed. Hence, a binary definition appears to hide some differences in relationship between fertility and exposure to conflict conditions, in a way that highlights how a more direct and continuous exposure, not mediated by migration, influences households' decisions on the first birth already.

8 Limitations

Before discussing the results in detail, it is important to highlight that examining the timing of different parities and its relationship with conflict violence using retrospective data, as this paper does, bears a number of limitations. First, the study of the transition from parity j to $j+1$ introduces the problem of selectivity in that each transition can only be analysed for those women who have already reached parity j (or marriage) at the time of the survey. I sought to tackle such selectivity issue as much as possible by controlling for theoretically relevant socio-economic and demographic covariates as well as by allowing for unobserved heterogeneity among women.

Second, for as much as birth histories allow to trace back historical trends in fertility, DHS data do not permit a more detailed examination of changes in the socio-economic position and conflict status of women over time, and in particular during periods of wide social turbulence due to conflict and economic restructuring. This makes it difficult to carefully disentangle the effects of conflict-caused economic dislocation and of the economic downturn due to the collapse of the USSR on childbearing outcomes. Nonetheless, information on conflict-related migration patterns of individuals as well as detailed data on death of children in the survey served to identify those groups that, on top of difficulties caused by the collapse of the USSR, have also endured the harsh consequences of conflict violence, such as forced migration. Hence, the estimates presented here provide some evidence that the conflict itself, above and beyond economic crisis alone, is associated with fertility outcomes in Azerbaijan.

9 Discussion and conclusion

This study is the first to provide a detailed account of the fertility changes occurred in Azerbaijan since independence and to directly investigate the association between armed conflict and childbearing outcomes in the post-Soviet world. Descriptive trend analyses showed that, after the collapse of the USSR and the start of the full-scale conflict with Armenia, TFR declined for all women, particularly as a result of falling progression to the third birth. Declining rates were evident across all age-categories and, in the early post-independence years, visibly in young adult conflict-affected women. This provides an indication of the type of fertility changes Azerbaijan has undergone over time in its general population, but also in various subgroups, and can guide prediction on future population developments and comparisons with analogous, but more studied countries in the former USSR space.

The finding of a general 'stopping-sooner' behaviour in the early post-independence years mirrors what has been found in much of the literature on fertility changes in countries that experienced harsh economic downturns following the Soviet breakdown. In Armenia (Billingsley, 2011) and in ex-Soviet Central Asian republics (Agadjanian, 1999; Agadjanian and Makarova, 2003; Clifford et al., 2010), for instance, the early 1990s were too characterised by fertility declines engineered via limitation of higher-order births rather

than birth postponement. In the subsequent decades, with economic recovery and the evolution of nation-building processes, patterns of first birth postponement began to emerge in these settings (Billingsley, 2010; Billingsley and Duntava, 2017; Spoorenberg, 2013). Net of conflict effects, this dynamic bi-phasic model of fertility decline – that is reductions driven by birth limitation at high parities during periods of crisis and by postponement of family events once the economy develops (Lerch, 2018) – may also apply at the national level to Azerbaijan. My analyses seem to point towards this direction. After dipping below below 2 children per woman in the early 2000s, between 2002–2005 – when Azerbaijan's economy began to expand and experience steady trade surpluses thanks to a booming hydrocarbon industry (World Bank, 2014) – period fertility stabilised around the replacement level with starting signs of first birth postponement in the general population. Any discussion on recent patterns of fertility in Azerbaijan is, however, only speculative with the data at hand. More up-to-date micro-level information than the survey data used in this paper are required to further explore this hypothesis of a biphasic model of fertility transition, understand its current underlying mechanisms and, importantly, investigate how they play out in Azerbaijan's various conflict subgroups.

Beyond understanding Azerbaijan's post-independence fertility trajectories, I also sought to examine more in depth the relationship between the observed trends and women's exposure to conflict violence resulting from the Nagorno-Karabakh war. Most studies on conflict and fertility limit the analyses to the first birth transition or approach the relationship more generally by looking at children ever born or at other aggregate measures of fertility without considering the timing of such births. By contrast, I addressed the possibility that the effects of political violence and tensions differ at different birth orders depending on the country's stage in the fertility transition. This hypothesis suggests that conflict and related uncertainty will have a stronger effect on that birth order that would lead a household to reach the average fertility level in the population. In the Azerbaijani context – characterised by almost universal motherhood and by limitation of higher-order births – that is arguably the second birth.

The main findings of this research appear to support this hypothesis. While the probability of transitioning to the first and third birth did not differ across groups exposed differently to conflict violence, visible differences emerged for the transition to second birth. Women who have been exposed to conflict violence – whether residents in Karabakh, IDPs or refugees – have around 50% higher chances of having a second child than less exposed women. This probability was also higher in the peak conflict year (1992) for conflict-affected women, and especially for Karabakh residents, while for the Azerbaijani population as a whole, it began to decline in the early post-independence period. This result suggests that different behaviours have been in place: on the one side the less affected population responded to the turbulent economic conditions by continuously lowering second-order fertility; by contrast, those who were also affected by political violence did the opposite in highly violent years or recuperated their second births as conditions became more stable.

From a theoretical point of view, this finding somehow resonates with the "fertility promotion" hypothesis (Abbasi-Shavazi et al., 2009; Fargues, 2000) and can be explained by two mechanisms. On the one hand, in Azerbaijan where having one child only is becoming more and more prevalent, the increasing propensity to have a second child for conflict-affected women – especially those who never migrated from the Karabakh region – points towards a stronger insurance role of children for vulnerable populations. Interestingly, this appears to be irrespective of the gender of the previous child. Azerbaijan has been for long among countries with high levels of sex ratio at birth (Duthé et al., 2012; Guilmoto, 2009; Meslé et al., 2005; Yüksel-Kaptanoğlu et al., 2014). Yet, the fact that the sex of the previous birth was influential for the transition to the next birth among less affected women only could indicate that the "added" value of having

a son results more from patrilineal societal structures and patriarchal values than from shared feelings of external threat to group survival or conflict-related motives (Abbasi-Shavazi et al., 2009; Das Gupta and Li, 1999; Mavisakalyan and Minasyan, 2018). On the other hand, in a conflict where groups base territorial legitimacy on population size, as it is arguably the case in the Nagorno-Karabakh conflict, replacement effects are likely to be behind the increased risk of second birth (as well as behind the higher hazard of first birth for Karabakh residents).

A second and related element that emerges from the analyses is that the way in which people experience conflict violence matters for their fertility responses (Kraehnert et al., 2019). Echoing findings from other countries experiencing economic and violence-related crises (Schindler and Brück, 2019; Verwimp and van Bavel, 2005), the traumatic experience of losing a child during conflict years triggers strong replacement effects, irrespective of one's parity level. Moreover, while the probability of a first birth did not differ between less affected and women who migrated due to conflict, I observed a higher time-independent risk and no period changes relative to 1991 for women residing in Karabakh and thus who never moved from the conflict-affected area. The fact that only those continuously involved with conflict respond to uncertainty with higher first order fertility could indicate disruptive effects of forced migration on childbearing outcomes as well as possible assimilation to the behaviour of the less affected population as displaced women re-settled away from the conflict zones. Although the fertility patterns of IDPs have rarely been studied (perhaps because of the assumption of relatively homogeneous fertility trends within countries), findings from studies on refugee populations (Williams et al., 2013) and voluntary internal migrants (Daudin et al., 2019; Kulu, 2005) suggest more or less rapid assimilation to the average levels of fertility of the receiving population. Hence there is reason to suppose that similar long-run patterns have emerged among IDPs in Azerbaijan.

These findings concern policy-makers: in a context where fertility has been oscillating around the replacement level, if the less affected are also at a more advanced stage in the fertility transition, *ceteris paribus*, the ratio of exposed versus less exposed is going to decrease with time, and their needs are going to become more and more pressing. At the national level action should thus be taken to improve the supply chain management of family planning services that can safeguard the health of vulnerable women and their new-borns. As already recommended (UN Human Rights Council, 2015; UNHCR, 2013), this includes easing distance to services and supporting cost expenses in rural areas of Karabakh and in other parts of the country, especially now that refugee camps have been closed. This is important because – although improvements in general standards of living for Azerbaijani IDPs and refugees have been achieved during the 2000s, primarily in urban areas and thanks to an economy boosted by the oil sector and to policies focused on wealth re-distribution (World Bank, 2010) – as of 2015 poverty incidence for IDPs only was still estimated around 25%, to be more severe in rural zones and than among the non-displaced (World Bank, 2005, 2018). Recent estimates also indicate that about 70% of households displaced by the conflict with Armenia are still heavily dependent on state subsidies for their daily living and many suffer from social exclusion (World Bank, 2015). These realities are even harsher for displaced women, who tend to be confined to housekeeping work, and for the now second generation of IDPs (Norwegian Refugee Council, 2010). Similarly, significant regional disparities in economic growth have meant that the conflict-region of Karabakh and, hence, its residents have benefitted the least from the economic boom of the early 2000s. Additional steps should therefore be taken to close the gap in accessibility to reproductive health and family planning services for vulnerable Karabakhis and to ensure that their needs are met regardless of legally disputed and porous borders.

Moreover, the fact that conflict-affected women appear more likely to be exposed to pregnancy suggests that there may be gaps to fill with regards to information about reproductive health. Local policies should

thus seek to improve knowledge on family planning among IDP/refugee communities, standards of privacy and confidentiality as well as to eradicate provider biases (e.g. discrimination towards refugees) that limit access to and uptake of reproductive health services for vulnerable women. This is essential in a context where abortion is widespread and where it is reportedly difficult for some women and most men to openly discuss about fertility-related issues.

Overall, however, responsibilities should not be left to national decision-makers only. On top of all priorities there should be more concerted efforts at the international level to work towards reaching a credible peace settlement to the conflict in and around Nagorno-Karabakh. This is key for the development of today's Azerbaijan and, more generally in today's world, where – as in Nagorno-Karabakh and more recently in other formerly Soviet or Muslim settings – there is a tendency to "freeze" conflicts instead of finding durable solutions, with large potentials for such tensions to be thawed violently.

Notes

1. For mortality, see for instance Grein et al. (2003) for Angola; Tabeau and Bijak (2005) for Bosnia Herzegovina; Roberts et al. (2004) for Iraq; Spiegel and Salama (2000) for Kosovo. For migration, see Randall (2005) for Mali; Singh et al. (2005) for Uganda and Sudan and Williams (2007) for Nepal.

2. Croatia, Czech Republic, East Germany, Hungary, Poland, Slovenia and Slovakia.

3. Bulgaria, Moldova and Romania.

4. Russia, Belarus, Ukraine.

5. Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.

6. In September 1991, the Nagorno-Karabakh enclave declared its independence from the Azerbaijani republic. Since then, the character of the conflict precipitously changed from a low-intensity conflict fought predominantly between private militias to a full-scale inter-state conflict (Zurcher, 2007).

7. These include the districts of Agdam, Fizuli, Gubadly, Kelbajar, Jabrail and Zangilan.

8. An example of this escalation of violence occurred in April 2016 when hostilities broke out causing in just three days an estimated 150-350 deaths (UCDP-GED, 2018; US Department of State, 2016).

9. Following sample restriction to ever-married women aged 16+, the total unweighted sample size reduced to 5,721 observations

10. To ensure that the data are representative according to geographical population density and clustering, A-DHS provided sample weights were applied using Stata's svyset and related commands in all the estimations models.

11. For more detailed information on sample selection, please refer to the official report by the State Statistical Committee (SSC) of Azerbaijan and Macro International Inc. 2008.

12. Note that for trend analyses of TFR, the sample was not restricted to ever-maried women, but only to women aged 15-39 because of truncation as explained in the Methods section. For all trend analyses using survey data disaggregated by conflict status (TFR and ASFRs) the sample was limited to women aged 16-39 since individuals below age 16 were not asked the IDP/refugee status question. Information from ever married women were used in analyses of parity progression.

13. Given that data are truncated on older women, rates are here calculated for births and exposure of women aged 15-39. As in Azerbaijan most birth occur between ages 20-35, omitting the small fraction of births to women aged 40+ should be negligible. Calculated rates, thus, yield a conservative estimate of fertility overtime.

14. The synthetic cohort method allows calculating PPRs in the following way:

$$a_j = 1 - (1 - q_0)(1 - q_1)(1 - q_2)\dots(1 - q_{10})$$

where a_j represents the period progression from the j^{th} birth to the $(j+1)^{th}$. Accordingly, a_0 represents progression from zero to one child, a_1 from one to two children and so on. The set of proportions q_x are calculated, as Hinde (1998) suggests, so that the numerator is given by the number of women who had j^{th} birth in year t prior to the current year and had their $(j+1)^{th}$ birth in the current year. The denominator is then given by the difference between the total number of women who had a j^{th} birth in the year t prior to the current year and those, among them, who already had $(j+1)^{th}$ birth before the start of the current year t.

15. Alternatively, a gamma distribution can be used to model random effects accounting for unobserved heterogeneity (Larsen and Vaupel, 1993). Yet, this is more commonly used when time is considered as continuous. In discrete-time settings, random effects are typically assumed to be normally distributed (Steele, 2008).

16. Examples of these can be the frequency and time of intercourse, women' work status and educational level at each time point, normative barriers associated with childlessness, the thoroughness of the search for a suitable mate. In the case of conflict violence, in particular, these covariates are likely to be important as, for instance, conflict is likely to modify one's search in the marriage market (Shemyakina, 2013), increase coital frequency in settings where war rapes become widespread, or reduce it due to male conscription or if violence generates large-scale migration (Buvinic et al., 2013).

17. As said in the section on Data and measures, women aged 15 years old at the time of the survey were not asked information on their IDP/refugee status and thus were excluded from the analyses. Only 1 observation had to be dropped accordingly.

18. Models estimating the odds of conception in a given year since marriage (first or second birth) were also estimated by lagging the date of birth of the child back of 9 months. I prefer to report models for the odds of giving birth as conflict exposure may not only correlated with conception, but also with its realisation in a live birth. Nonetheless, results were largely similar and are available upon request.

19. Note that official registration data on age-specific fertility rates from TransMonEE (UNICEF Europe and Central Asia Regional Office, 2018) for Azerbaijan are available for age 5-years age groups from age 20 to age 35 only precluding calculation of the TFR 15–39 for direct comparison with the survey estimate. Hence, TransMonEE estimates are here reported for women aged 15–49.

20. Vital registration data from the TransMonEE database show that age-specific fertility rates for women aged 35–49 were 8.89 in 2003, 10.38 in 2004 and 10.08 in 2005. A rising trend which might explain the small mismatch between survey and vital registration estimates.

21. For this reason, period PPRs for first, second and third births for 1990 and 2006 are not displayed.

22. Extended tables for all the transitions and conflict groups are reported in Appendix A.

23. For this reason, predicted probabilities for the first and last time points are not displayed.

24. Results controlling for regional differences in fertility are not shown, but available upon request.

25. See Table 9 in Appendix B.

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10 Tables

Table 1: Key summary statistics of A-DHS weighted samples of ever-married women by conflict status

	Less exposed	Exposed	Difference	*p*-value	IDP/ refugee	Karabakh residents	Total
Residence type (%)							
Urban	54.98	65.07	10.09	0.045*	77.34	11.16	56.27
Rural	45.02	34.93			22.66	88.84	43.73
Education (%)							
Secondary or less	70.16	65.48	4.68	0.116	64.28	70.75	69.56
Secondary special	17.22	22.82	-5.60		23.28	20.79	17.94
Higher	12.62	11.70	0.92		12.44	8.46	12.50
Age (mean, years)	35.08	34.57	0.51	0.226	34.62	34.36	35.01
Age at marriage (mean, years)	21.07	21.29	-0.22	0.367	21.19	21.72	21.09
Age at first birh (mean, years)	22.33	22.41	-0.08	0.741	22.32	22.79	22.34
Age at second birth (mean, years)	24.40	24.47	-0.07	0.777	24.49	24.36	24.41
Age at third birth (mean, years)	26.73	26.51	0.22	0.438	26.41	26.72	26.71
Children ever born (mean)	2.28	2.26	0.02	0.809	2.23	2.41	2.27
Total number in sample (unweighted)	4790	931			463	468	5721
Percentage in sample (unweighted)	83.73	16.27			8.09	8.18	100.00

Source: 2006 A-DHS. Exposed women are defined using the 'broad' definition of conflict exposure. The IDP/refugee sample includes women who who did not live in Karabakh region at the time of the survey, but who (i) self-identified as IDP/refugee in the survey or (ii) whose husbands did. Karabakh residents include women who never migrated from the Karabakh region. *P*-values are reported for Pearsons'χ^2-test and for tests of difference in means.

Table 2: Odd ratios of first, second and third birth, ever-married women by conflict status

	1^{st} **birth**	2^{nd} **birth**	3^{rd} **birth**
Panel A: All women			
Conflict exposure (ref: No)			
Yes	1.102	1.512***	1.033
Previous child died during conflict years (ref: No)			
Yes		2.484*	8.334***
Age at first marriage	(0.768)***		
Age at first marriage squared	(-0.018)***		
Age at first birth		0.946***	
Age at second birth			0.936***
$\sigma^2 \upsilon$	4.754	0.917	0.351
Observations	9195	12415	23470
Panel B: Exposed women			
Previous child died during conflict years (ref:No)			
Yes		5.270***	9.870**
Age at first marriage	(0.773)***		
Age at first marriage squared	(-0.019)***		
Age at first birth		0.955	
Age at second birth			0.918
$\sigma^2 \upsilon$	2.001	0.467	1.020
Observations	1529	1622	3370
Panel C: Less exposed women			
Previous child died during conflict years (ref: No)			
Yes		0.418	8.089***
Age at first marriage	(0.692)***		
Age at first marriage squared	(-0.017)***		
Age at first birth		0.944***	
Age at second birth			0.938***
$\sigma^2 \upsilon$	4.897	0.752	0.278
Observations	7166	10793	20100

Source: 2006 A-DHS. Columns represent exponentiated coefficients (odd ratios). Figures in backets are non-exponentiated regression coefficients. *p<0.05, **p<0.01, ***p<0.001. *Notes*: **Panel A**: The all-women sample consists of ever-married women aged 16+ in 2006. **Panel B**: Subsample of exposed women defined according to the 'broad' definition of conflict exposure (see: Data and measures section). **Panel C**: Subsample of less exposed women defined according to the 'broad' definition of conflict exposure. All regressions control for duration since start of exposure (<2, 3-6, 7-10, 11+ years), calendar year (ref: 1991), education (secondary or less, secondary-special, higher), residence type (urban, rural) and sex of the previous child for 2^{nd} and 3^{rd} birth. Regressions are all specified with unobserved heterogeneity terms at the woman-level. Subjects enter analysis at date of marriage for first birth and 5 months after the previous birth for subsequent births. Extended Tables with all regression coefficients are reported in Appendix A.

11 Appendix A

Table 3: Odds ratios of first birth after marriage, ever-married women

	All women	Less exposed	Exposed
Conflict exposure (ref: No)			
Yes	1.102		
Duration since marriage (ref: <2 years)			
3-6	0.682*	0.770	0.377**
7-10	0.367***	0.462**	0.0615**
11+	0.548	0.696	0.156*
Calendar year (ref: 1991)			
1980 or before	0.545*	0.565*	0.341
1981	0.461*	0.486	0.348
1982	0.685	0.585	1.512
1983	0.936	0.944	0.920
1984	0.656	0.664	0.560
1985	0.641	0.488	3.704
1986	0.881	0.928	0.494
1987	1.202	0.957	4.919
1988	0.986	0.894	1.538
1989	0.804	0.786	0.774
1990	0.806	0.809	0.660
1992	0.943	1.022	0.520
1993	1.205	1.165	1.300
1994	1.080	1.060	1.030
1995	0.807	0.740	1.381
1996	0.650	0.702	0.333
1997	0.995	0.935	1.107
1998	1.188	1.148	1.440
1999	0.602	0.624	0.614
2000	0.478**	0.455*	0.546
2001	0.474*	0.406*	0.945
2002	0.616	0.557*	1.019
2003	0.602	0.499*	1.674
2004	0.393***	0.376**	0.350
2005	0.053***	0.039***	0.173*
Education (ref: Secondary or less)			
Secondary-special	1.155	1.087	1.679
Higher	1.205	1.040	4.089*
Residence type (ref: Urban)			
Rural	1.171	1.214	0.857
Age at first marriage	2.135***	2.166***	1.998**
Age at first marriage squared	0.982***	0.981***	0.984***
σ_v^2	4.754	4.897	2.001
Observations	9195	7166	1529

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

Table 4: Odds ratios of second birth, ever-married women

	All women	Less exposed	Exposed
Conflict exposure (ref: No)			
Yes	1.512***		
Duration since first birth (ref: <2 years)			
3-6	0.672*	0.666*	0.717
7-10	0.203***	0.213***	0.151*
11+	0.038***	0.041***	0.018**
Calendar year (ref: 1991)			
1980 or before	0.896	0.959	0.566
1981	0.584	0.473**	2.611
1982	0.844	0.855	0.919
1983	0.840	0.807	1.508
1984	0.988	1.000	1.241
1985	0.941	1.012	0.678
1986	0.872	0.855	1.295
1987	1.288	1.304	1.595
1988	0.948	0.958	1.145
1989	0.817	0.725	2.211
1990	0.773	0.719	1.832
1992	0.793	0.760	1.531**
1993	0.624*	0.637*	0.678
1994	0.634*	0.597*	1.368
1995	0.495***	0.503***	0.520
1996	0.462***	0.474***	0.515
1997	0.427***	0.438***	0.498
1998	0.469***	0.474***	0.612
1999	0.482***	0.466***	0.832
2000	0.287***	0.298***	0.328*
2001	0.367***	0.364***	0.523
2002	0.405***	0.391***	0.655
2003	0.393***	0.375***	0.701
2004	0.464***	0.446**	0.776
2005	0.064***	0.057***	0.156*
Education (ref: Secondary or less)			
Secondary-special	0.755**	0.748**	0.778
Higher	0.714**	0.719*	0.650
Residence type (ref: Urban)			
Rural	1.653***	1.651***	1.652***
Age at first birth	0.946***	0.944***	0.955
Sex of first child (ref: Male)			
Female	1.150*	1.188**	0.976
First child died during conflict years (ref: No)			
Yes	2.484*	0.418	5.270***
σ_v^2	0.917	0.752	0.467
Observations	12415	10793	1622

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

Table 5: Odds ratios of third birth, ever-married women

	All women	Less exposed	Exposed
Conflict exposure (ref: No)			
Yes	1.033		
Duration since second birth (ref: <2 years)			
3-6	0.693***	0.680***	0.809
7-10	0.260***	0.228***	0.719
11+	0.067***	0.060***	0.154
Calendar year(ref: 1991)			
1980 or before	3.002***	2.737***	7.174
1981	1.849*	1.587	9.559**
1982	1.871*	1.750	2.567
1983	2.271***	2.028**	5.363*
1984	2.852***	2.293***	1.574***
1985	2.559***	1.932**	1.850***
1986	1.874**	1.586	8.345***
1987	1.833*	1.535	10.330**
1988	1.876**	1.541*	10.120***
1989	1.621*	1.441	4.146*
1990	1.323	1.221	2.718
1992	0.968	0.835	3.109*
1993	1.003	0.921	2.120
1994	0.704	0.658*	1.291
1995	0.689	0.645*	1.163
1996	0.817	0.790	1.005
1997	0.653*	0.618*	0.964
1998	0.705	0.663	1.110
1999	0.496**	0.492**	0.465
2000	0.568*	0.564*	0.569
2001	0.399***	0.413***	0.278
2002	0.473***	0.456***	0.632
2003	0.592*	0.593*	0.615
2004	0.588*	0.530**	1.200
2005	0.266***	0.232***	0.651
Education (ref: Secondary or less)			
Secondary-special	0.904	0.943	0.654
Higher	0.727*	0.717*	0.749
Residence type (ref: Urban)			
Rural	2.122***	2.222***	1.370
Age at second birth	0.936***	0.938***	0.918
Sex of prior children (ref: At least one male)			
Only females	1.570***	1.603***	1.317
Second child died during conflict years (ref: No)			
Yes	8.334***	8.089***	9.870**
σ_v^2	0.351	0.278	1.020
Observations	23470	20100	3370

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

Table 6: Odds ratios of first birth by extended conflict status, ever-married women

	All women	Less exposed	IDPs/refugees	Karabakh residents
Conflict exposure (ref: No)				
IDPs/refugees	1.043			
Karabakh residents	1.435*			
Duration since marriage (ref: <2 years)				
3-6	0.682*	0.770	0.321*	1.015
7-10	0.368***	0.462**	0.038*	0.638
11+	0.549	0.696	0.122*	0.087
Calendar year (ref: 1991)				
1980 or before	0.544*	0.565*	0.286	0.303
1981	0.460*	0.486	0.308	0.179
1982	0.683	0.585	1318	2.790
1983	0.933	0.944	0.839	0.827
1984	0.654	0.664	0.344	4.202
1985	0.641	0.488	3.514	2.849
1986	0.880	0.928	0.359	2.344
1987	1.201	0.957	4.249	5.763
1988	0.983	0.894	2.500	0.109
1989	0.802	0.786	0.491	2.745
1990	0.805	0.809	0.508	1.563
1992	0.943	1.022	0.412	4.326
1993	1.204	1.165	1.094	2.602
1994	1.079	1.060	1.071	0.873
1995	0.805	0.740	1.526	0.764
1996	0.650	0.702	0.295	0.788
1997	0.993	0.935	1.396	0.194
1998	1.185	1.148	1.947	0.380
1999	0.600	0.624	0.672	0.638
2000	0.477**	0.455*	0.515	0.699
2001	0.474*	0.406*	0.829	2.006
2002	0.614	0.557*	0.982	0.819
2003	0.602	0.499*	1.436	4.855
2004	0.393***	0.376**	0.227	3.009
2005	0.053***	0.039***	0.159*	0.046
Education (ref: Secondary or less)				
Secondary-special	1.152	1.087	2.276*	0.182*
Higher	1.199	1.040	8.734**	0.069*
Residence type (ref: Urban)				
Rural	1.152	1.214	0.722	0.867
Age at first marriage	2.136***	2.166***	1.843*	4.962*
Age at first marriage squared	0.982***	0.981***	0.985**	0.965*
σ_v^2	4.285	4.897	1.377	10.560
Observations	9195	7666	777	752

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

Table 7: Odds ratios of second birth by extended conflict status, ever-married women

	All women	Less exposed	IDPs/refugees	Karabakh residents
Conflict exposure (ref: No)				
IDPs/refugees	1.508***			
Karabakh residents	1.535***			
Duration since first birth (ref: <2 years)				
3-6	0.672*	0.666*	0.775	0.352**
7-19	0.203***	0.213***	0.179*	1.002
11+	0.038***	0.040***	0.012**	0.071***
Calendar year (ref: 1991)				
1980 or before	0.896	0.959	0.441	1.743
1981	0.585	0.473**	2.237	3.545
1982	0.844	0.855	0.620	6.933*
1983	0.841	0.807	1.188	4.057
1984	0.988	1.000	1.113	2.066
1985	0.940	1.012	0.338	7.749*
1986	0.872	0.855	0.912	4.874
1987	1.288	1.304	1.245	3.174
1988	0.948	0.958	0.794	5.578
1989	0.817	0.725	1.733	4.147
1990	0.773	0.719	1.405	5.201*
1992	0.793	0.761	1.119**	9.002**
1993	0.624*	0.637*	0.557	1.312
1994	0.634*	0.597*	1.035	3.119
1995	0.495***	0.503***	0.314	3.656*
1996	0.462***	0.474***	0.379	1.418
1997	0.427***	0.438***	0.355	1.857
1998	0.469***	0.474***	0.402	4.453*
1999	0.482***	0.466***	0.585	4.989
2000	0.287***	0.298***	0.244**	0.956
2001	0.368***	0.364***	0.409	1.234
2002	0.405***	0.391***	0.464	2.928
2003	0.393***	0.375***	0.573	1.383
2004	0.464***	0.446**	0.647	1.318
2005	0.064***	0.057***	0.103*	0.882
Education (ref: Secondary or less)				
Secondary-special	0.755**	0.748**	0.686	1.523*
Higher	0.714**	0.719*	0.621	0.665
Residence type (ref: Urban)				
Rural	1.651***	1.651***	1.836*	1.238
Age at first birth	0.946***	0.944***	0.985	0.885***
Sex of first child (ref: Male)				
Female	1.150*	1.188**	0.91	1.308
First child died during conflict years (ref: No)				
Yes	2.485*	0.400	4.234***	0.883
σ_v^2	0.719	0.715	0.436	0.013
Observations	12415	10793	822	697

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

Table 8: Odds ratios of third birth by extended conflict status, ever-married women

	All women	Less exposed	IDPs/refugees	Karabakh residents
Conflict exposure (ref: No)				
IDPs/refugees	1.021			
Karabakh residents	1.077			
Duration since second birth (ref: <2 years)				
03-6	0.694***	0.680***	0.917	0.647*
17-10	0.260***	0.228***	1.089	0.261
11+	0.067***	0.060***	0.156	0.183
Calendar year (ref: 1991)				
1980 or before	3.002***	2.737***	7.556	8.551*
1981	1.848*	1.587	1.650*	1.571
1982	1.871*	1.750	2.764	2.522*
1983	2.272***	2.028**	7.137*	3.196
1984	2.853***	2.293***	3.005***	2.658
1985	2.560***	1.932**	3.461***	3.430
1986	1.873**	1.586	1.421**	3.150
1987	1.832*	1.535	3.142**	0.761
1988	1.875**	1.541*	1.896**	2.449*
1989	1.620*	1.441	4.894*	2.556
1990	1.323	1.221	3.188	2.156
1992	0.967	0.835	4.257*	1.618
1993	1.003	0.921	2.701	1.421
1994	0.704	0.658*	1.285	1.538
1995	0.689	0.645*	1.025	1.510
1996	0.817	0.790	0.940	1.120
1997	0.653*	0.618*	1.048	0.694
1998	0.705	0.663	1.123	1.015
1999	0.496**	0.492**	0.494	0.371
2000	0.568*	0.564*	0.657	0.344
2001	0.398***	0.413***	0.266	0.286
2002	0.473***	0.456***	0.639	0.577
2003	0.592*	0.593*	0.472	1.015
2004	0.588*	0.530**	1.546	0.542
2005	0.266***	0.232***	0.960	0.138
Education (ref: Secondary or less)				
Secondary-special	0.903	0.943	0.664	0.599
Higher	0.726*	0.717*	0.594	2.007
Residence type (ref: Urban)				
Rural	2.116***	2.222***	0.965	1.265
Age at second birth	0.936***	0.938***	0.900	0.942
Sex of prior child (ref: A least one male)				
Only females	1.570***	1.603***	1.229	1.626
Second child died during conflict years (ref: No)				
Yes	8.341***	8.089***	2.876*	2.807
σ_v^2	1.423	0.278	1.610	0.450
Observations	23470	20100	1888	1482

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

12 Appendix B

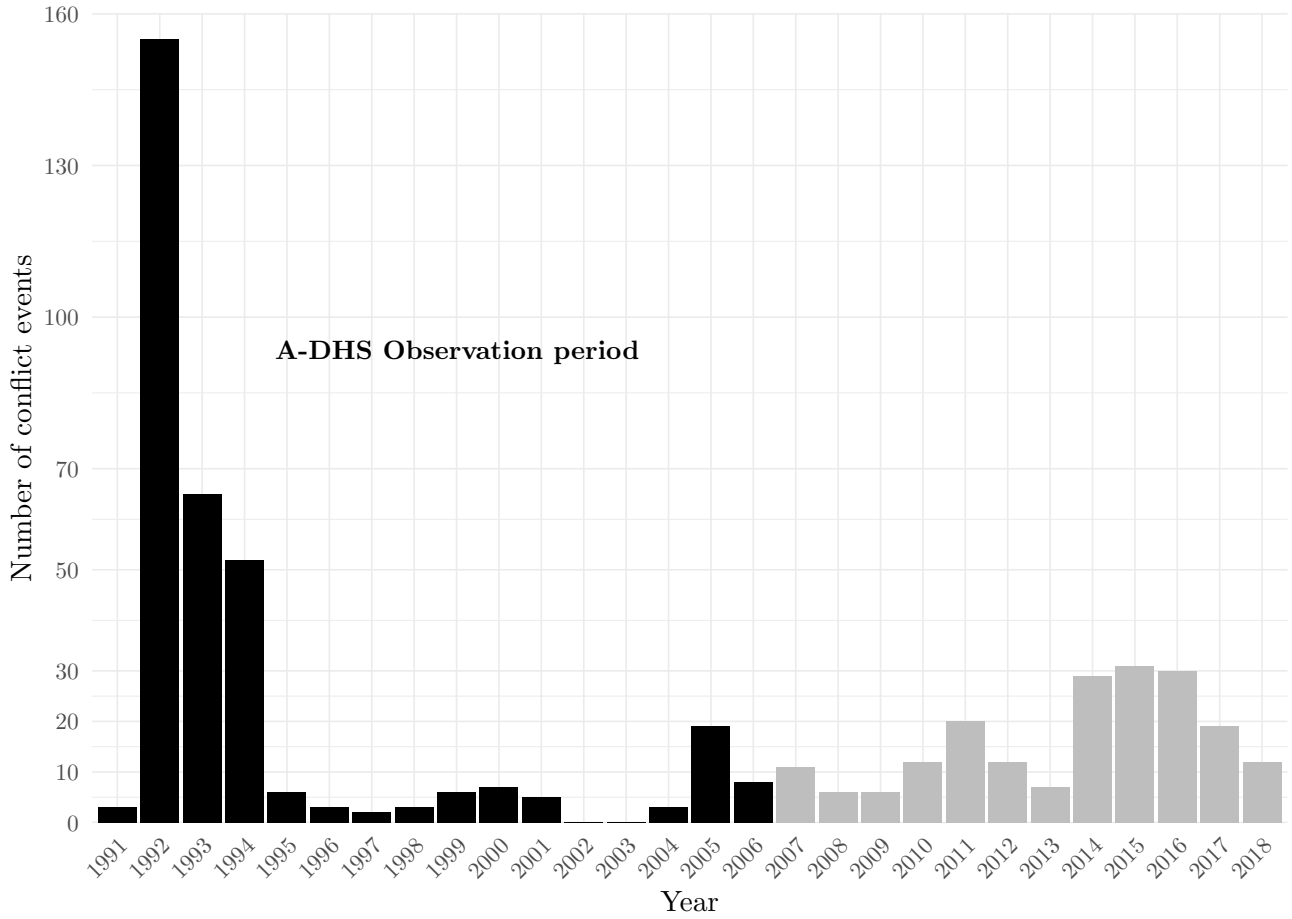
Table 9: Odds ratios of first, second and third birth by conflict status (narrow definition)

	1^{st} **birth**	2^{nd} **birth**	3^{rd} **birth**
Duration (ref: <2 years)			
3-6	0.682*	0.671*	0.693***
7-10	0.367***	0.204***	0.260***
11+	0.548	0.0376***	0.0667***
Calendar year (ref: 1991)			
1980 or before	0.546*	0.896	3.005***
1981	0.461*	0.588	1.851*
1982	0.684	0.851	1.873*
1983	0.937	0.849	2.272***
1984	0.655	0.994	2.853***
1985	0.640	0.942	2.560***
1986	0.881	0.873	1.875**
1987	1.201	1.295	1.835**
1988	0.985	0.95	1.877**
1989	0.804	0.824	1.622*
1990	0.806	0.777	1.323
1992	0.942	0.796	0.968
1993	1.204	0.627*	1.003
1994	1.079	0.637*	0.704
1995	0.806	0.497***	0.690
1996	0.650	0.464***	0.817
1997	0.994	0.431***	0.654*
1998	1.187	0.473***	0.705
1999	0.601	0.487***	0.496**
2000	0.478**	0.290***	0.568*
2001	0.474*	0.370***	0.399***
2002	0.614	0.408***	0.474***
2003	0.602	0.395***	0.592*
2004	0.393**	0.466***	0.587*
2005	0.053***	0.064***	0.266***
Conflict exposure - 'Narrow' definiton (ref: Not exposed)			
Exposed	1.172	1.468***	1.060
Education (ref: Secondary or less)			
Secondary-special	1.152	0.756**	0.903
Higher	1.206	0.715**	0.728*
Residence type (ref: Urban)			
Rural	1.171	1.643***	2.123***
Age at marriage	2.138***		
Age at marriage squared	0.982***		
Age at first birth		0.946***	
Age at second birth			0.936***
Sex of prior children (ref: A least one male)			
Only females		1.151*	1.572***
First child died during conflict years (ref: No)			
Yes		2.620**	
Second child died during conflict years (ref: No)			
Yes			8.322***
$\sigma^2 \upsilon$	4.279	0.723	0.351
Observations	9195	12415	23470

Exponentiated coefficients. Source: 2006 ADHS. *p<0.05, **p<0.01, ***p<0.001

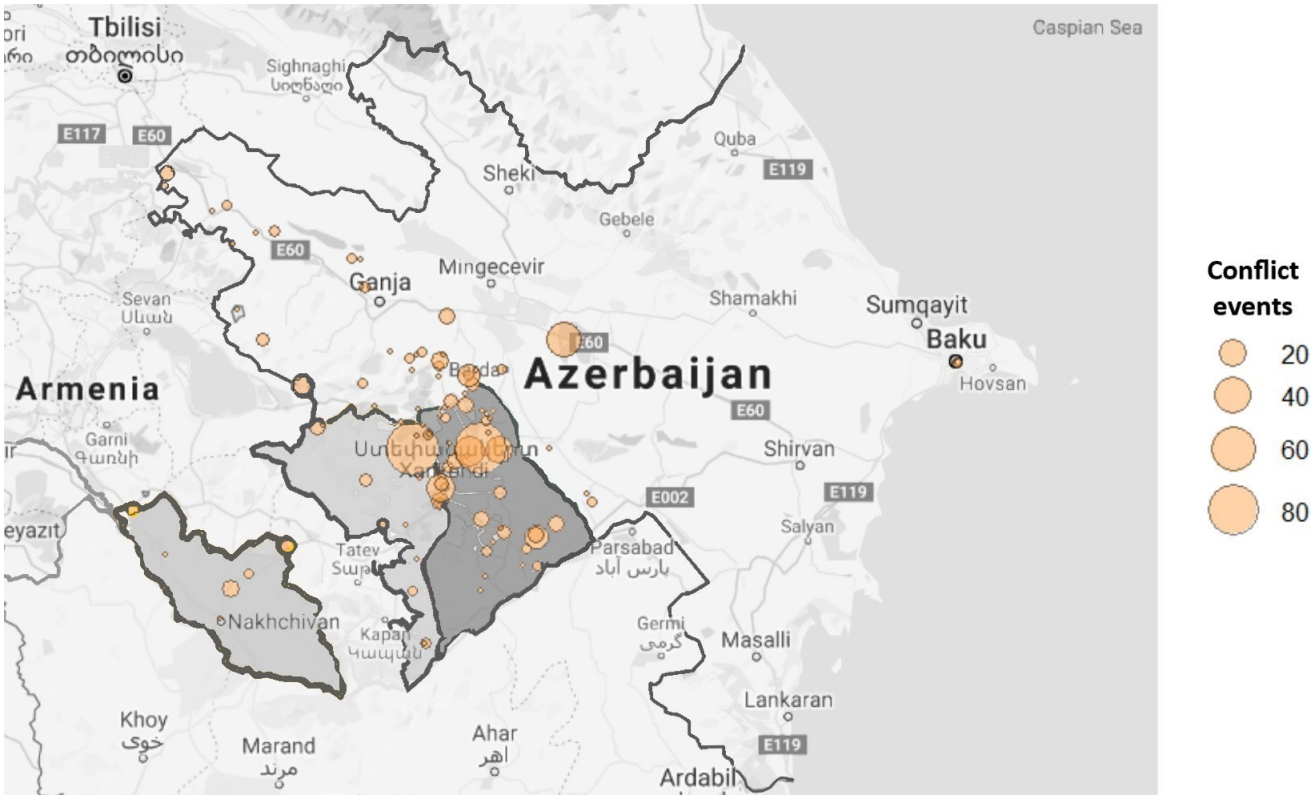
Figures

Figure 1. Count of Conflict Events, Azerbaijan 1991 – 2018



Source: Uppsala Peace and Conflict Database Georeferenced Event Dataset (UCDP-GED) (2018). Number of conflict events causing at least one casualty. Darker bars highlight the observation period covered by the A-DHS.

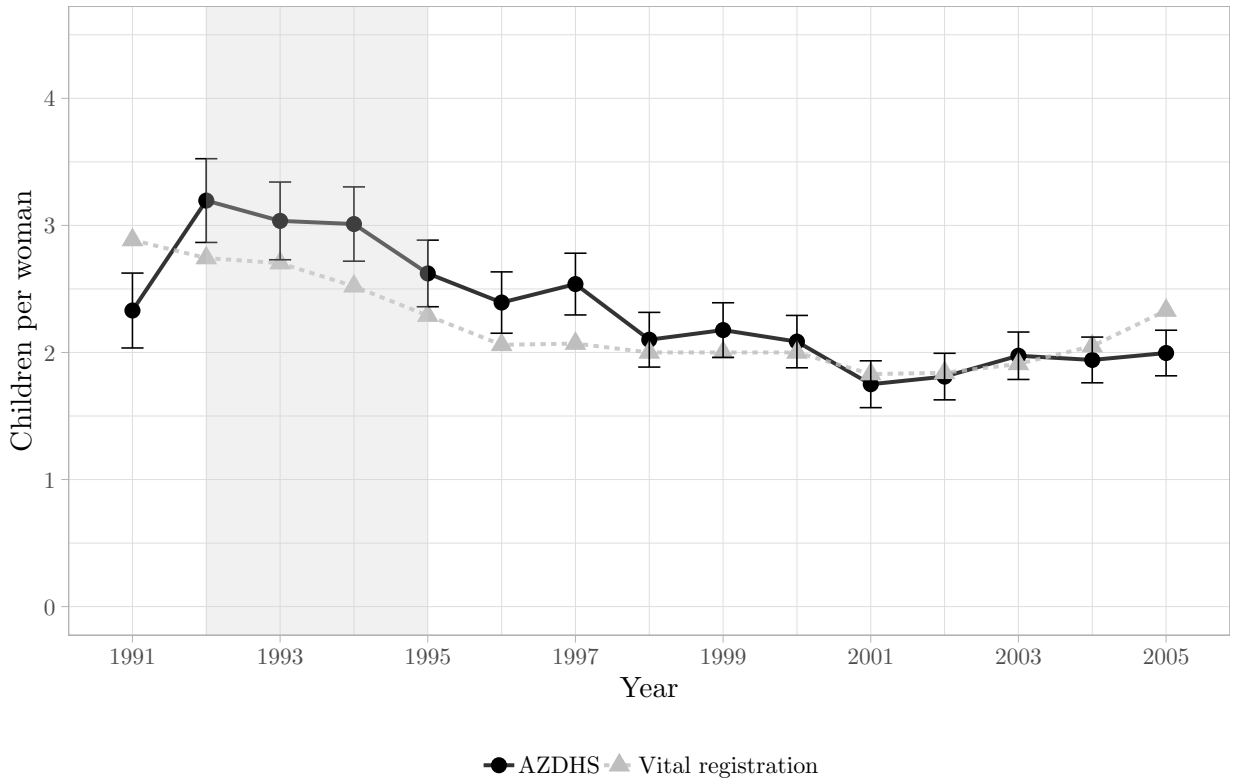
Figure 2. Conflict Events in Azerbaijan 1991-2018



Source: Georeferenced conflict data come from UCDP-GED dataset (2018).

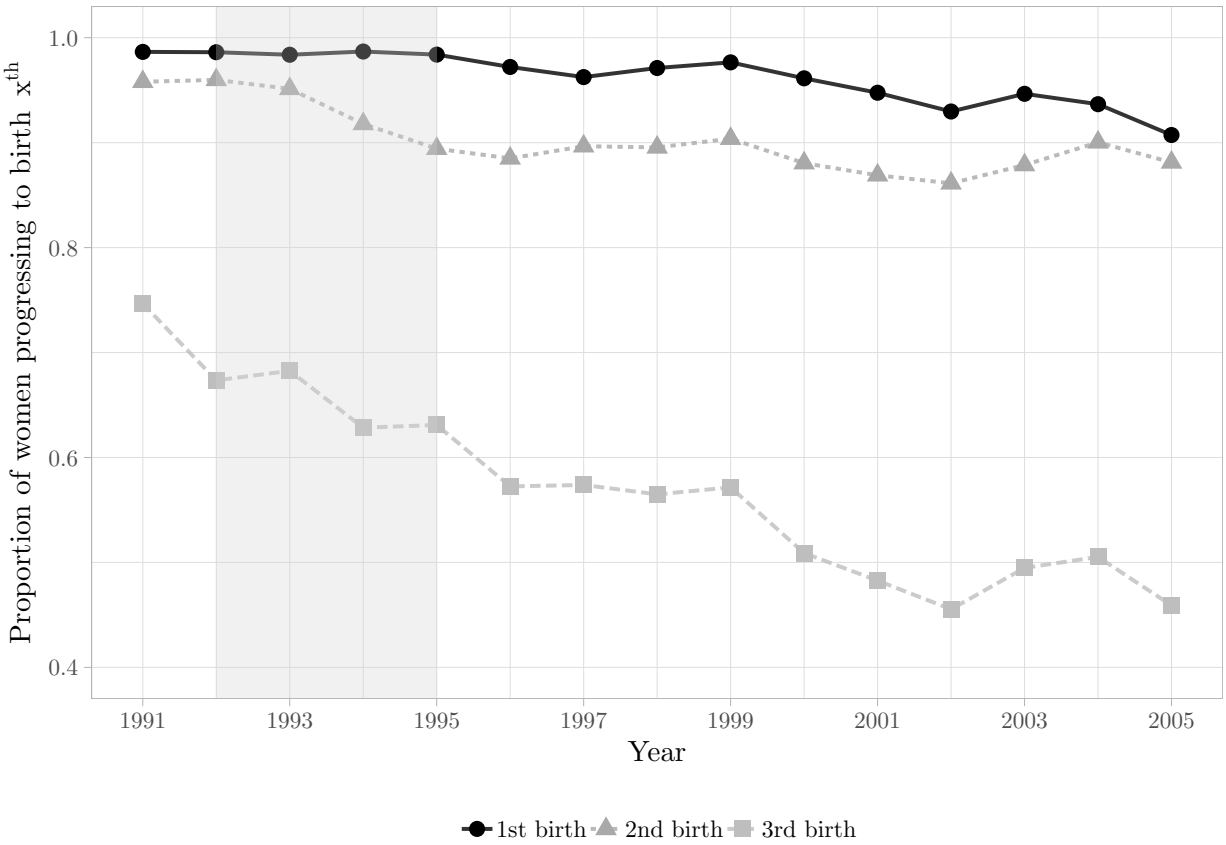
Areas in light grey indicate the non-sampled Nakhchivan and Kalbajar-Lachin regions. Areas in dark grey delineate the partially sampled Karabakh region. Larger orange dots indicate areas with higher number of conflict events causing at least one casualty.

Figure 3. Total Fertility Rate, Azerbaijan 1991 – 2005



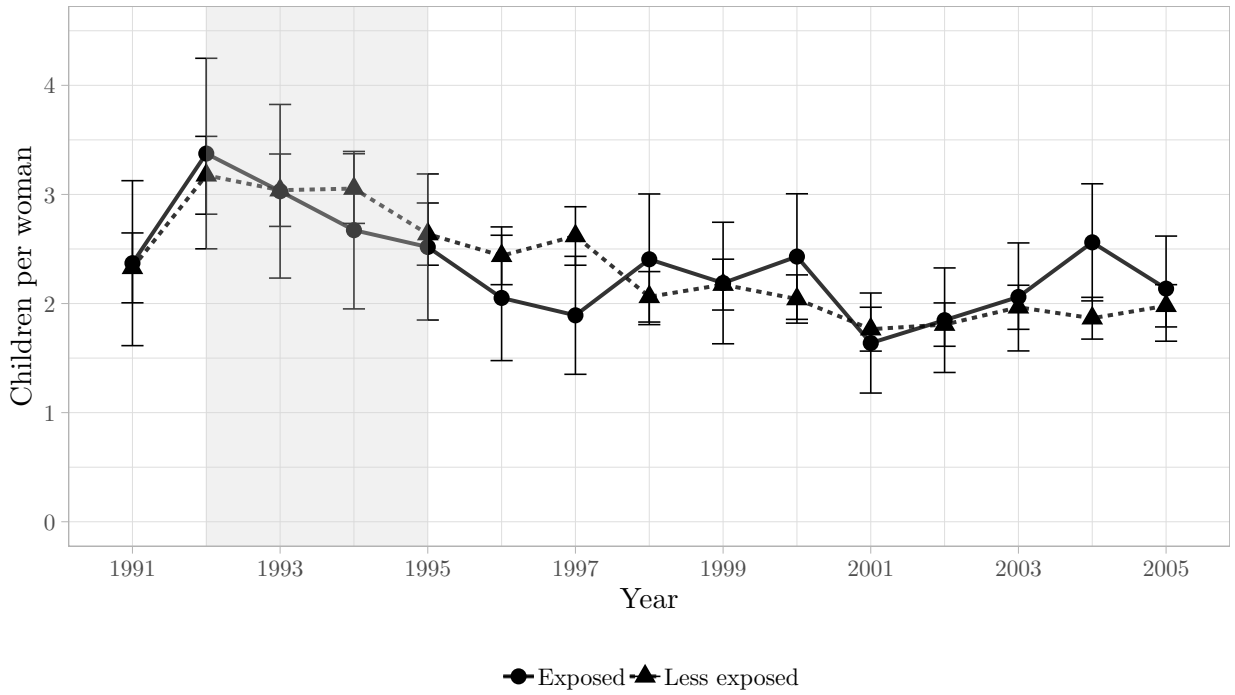
Source: TransMonEE vital registration data (women aged 15-49) and 2006 A-DHS (women aged 15-39). Shaded area highlights key conflict years.

Figure 4. Parity Pregression Ratios, Azerbaijan 1991 – 2005



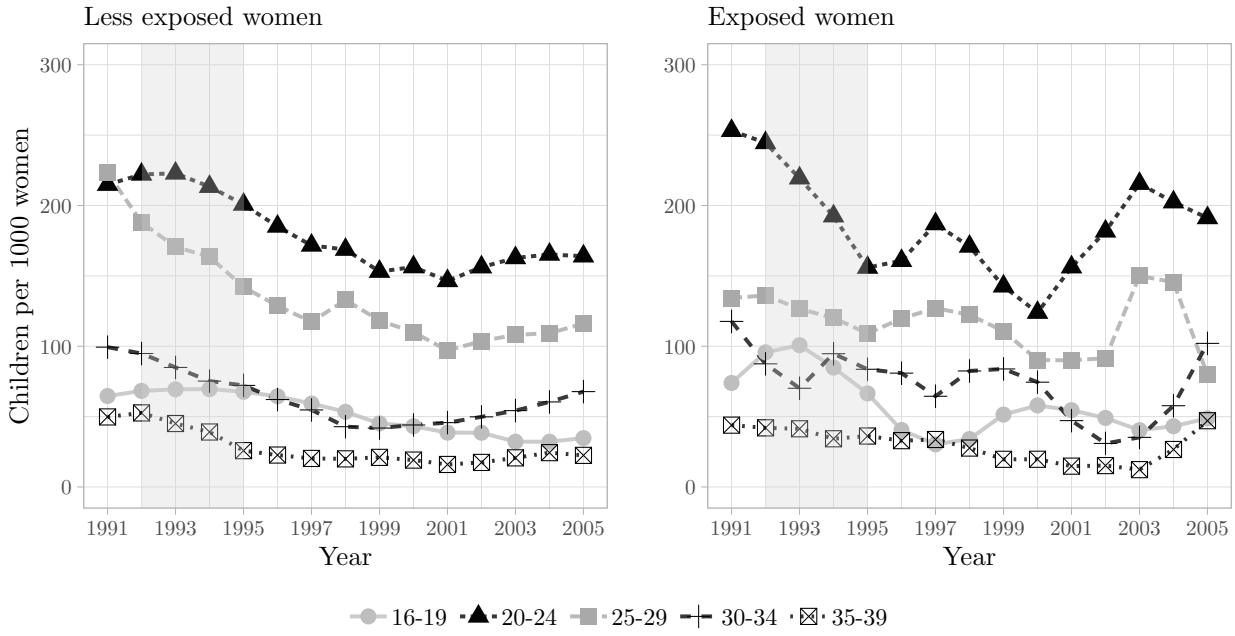
Source: 2006 A-DHS. 3-year moving averages. Shaded area highlights key conflict years.

Figure 5. Total Fertility Rate by Conflict Exposure, Azerbaijan 1991 – 2005



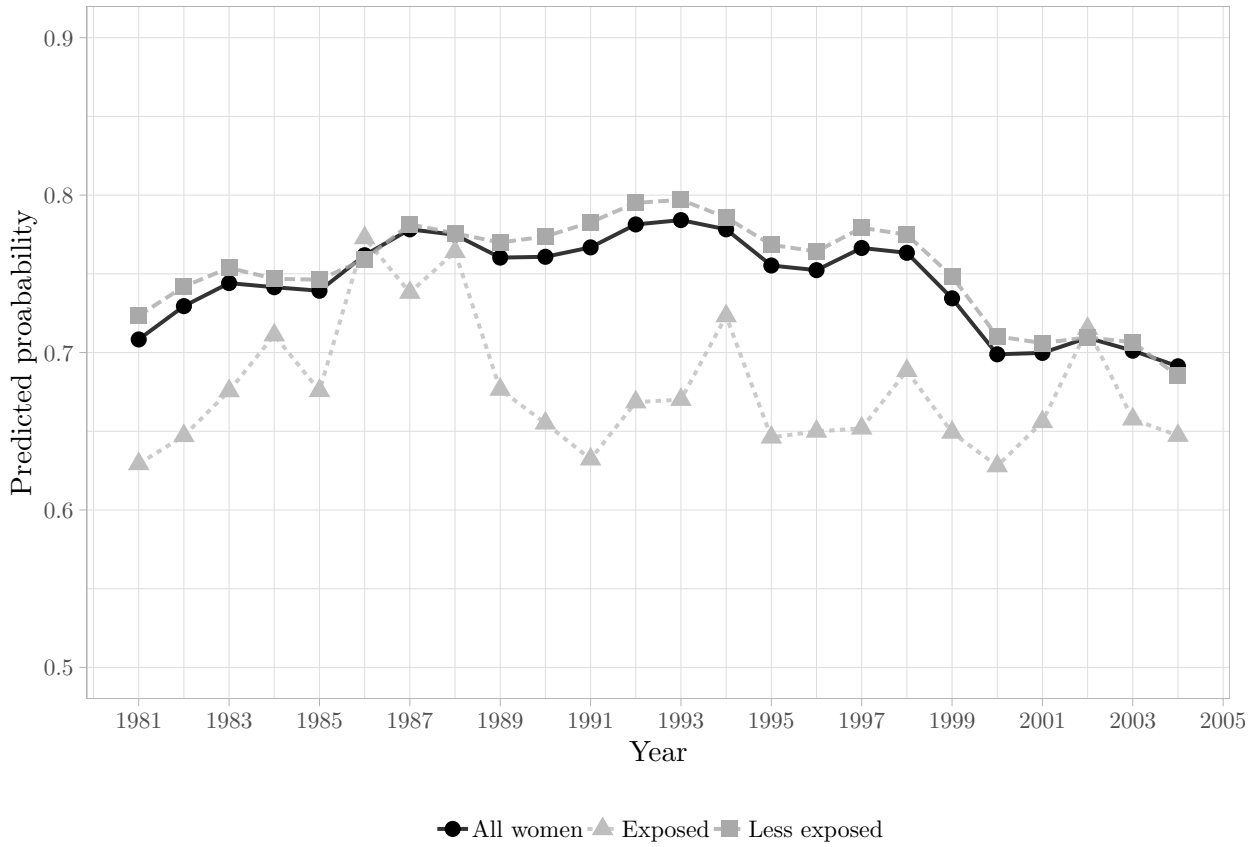
Source: 2006 A-DHS (women aged 16-39). 3-year moving averages.
Exposed women are defined according to the wide definition. This includes women who (i) always resided in Karabakh, (ii) self-identify as refugees from Armenia/IDPs from Nagorno-Karabakh or (iii) were not refugees or IDPs, but whose husbands were.

Figure 6. Age-specific Fertility Rates by Conflict Exposure, Azerbaijan 1991-2005



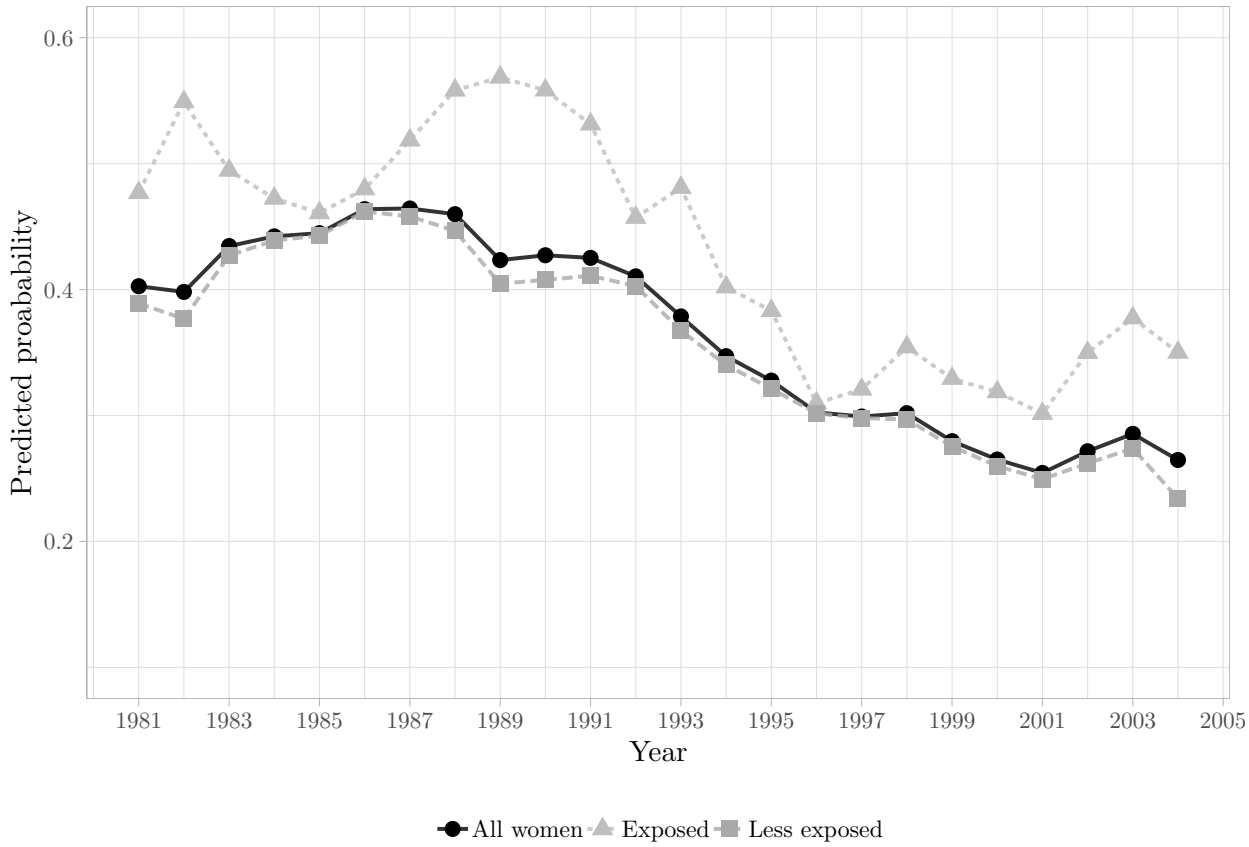
Source: 2006 A-DHS (women aged 16-39). 3-year moving averages. Exposed women are defined according to the wide definition. This includes women who (i) always resided in Karabakh, (ii) self-identify as refugees from Armenia/IDPs from Nagorno-Karabakh or (iii) were not refugees or IDPs, but whose husbands were. Shaded area highlights key conflict years.

Figure 7. Predicted Probabilities of First Birth by Conflict Exposure and Calendar Year



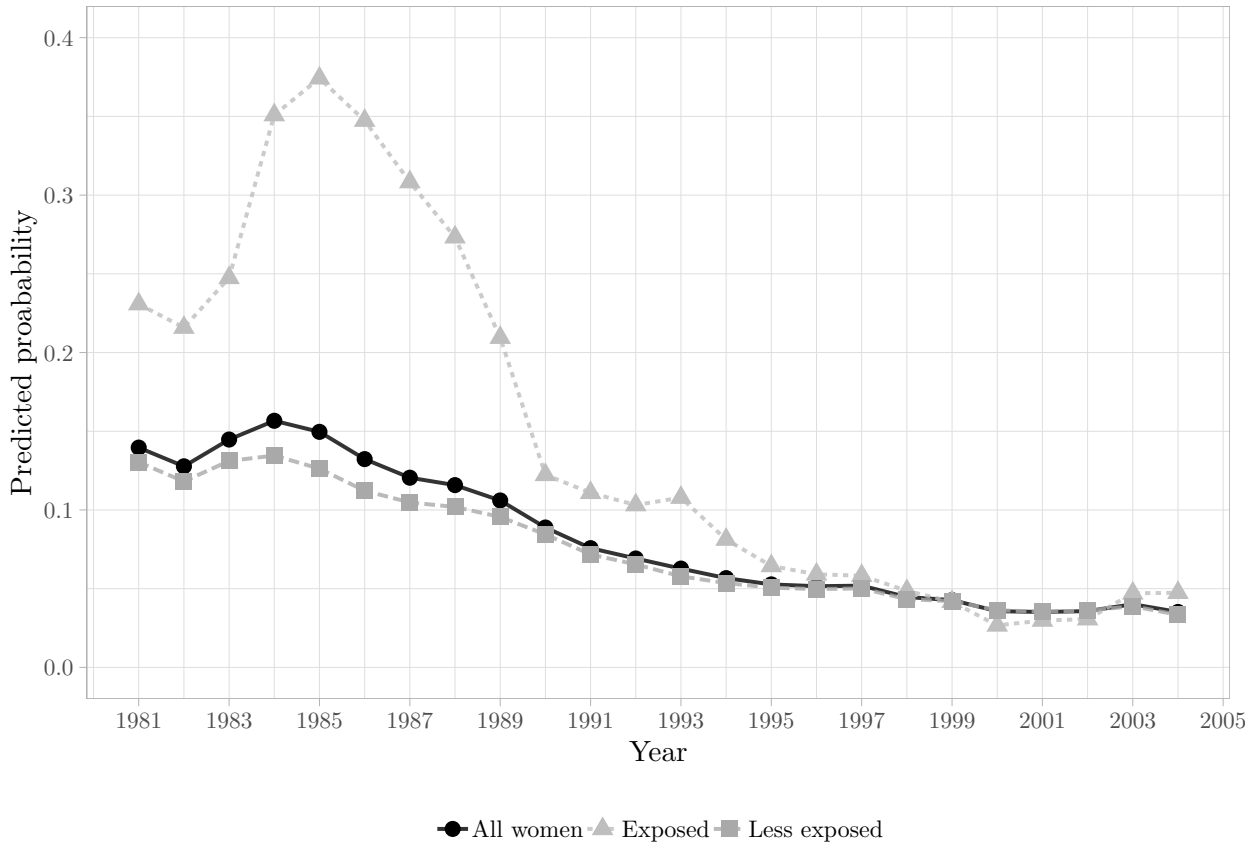
Source: As for Table 3. 3-year moving averages. Other predictors are set to their mean values.

Figure 8. Predicted Probabilities of Second Birth by Conflict Exposure and Calendar Year



Source: As for Table 4. 3-year moving averages. Other predictors are set to their mean values.

Figure 9. Predicted Probabilities of Third Birth by Conflict Exposure and Calendar Year



Source: As for Table 5. 3-year moving averages. Other predictors are set to their mean values.