

Armed Conflict and the Timing of Childbearing in Azerbaijan

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Research on fertility changes in former Soviet states of the South Caucasus is scant and has overlooked the role of armed conflicts. This study 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 behavior, and, only recently, slight birth postponement. While the conflict seems to have little influence on aggregate trends, discrete-time logit models accounting for unobserved heterogeneity reveal a 42–45 percent higher risk 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 for nonexposed women. Never-migrant women from Karabakh have also significantly higher probability of having a first child. Further positive effects on fertility are observed for women who lost a child during peak conflict years. Risk-insurance and replacement effects are possible mechanisms explaining such fertility responses.

Introduction

Armed conflicts represent one of the most important and recurring challenges facing human societies, with currently almost two billion people living in areas affected by violence and political instability worldwide (World Bank 2017). While some of the demographic consequences of conflict violence—mortality and forced migration in particular—receive substantial attention in population studies and considerable media coverage, there has been less research interest on the fertility effects of armed conflicts (Brunborg and Tabeau 2005; D’Aoust and Guha-Sapir 2010). This is of concern.

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First, in most societies, the family, its composition, and functioning are still fundamental to individuals' perception of life quality and well-being (Pichler 2006; Alesina and Giuliano 2010). This centrality is especially true for those living in conditions of protracted physical, political, and economic insecurity, where the family represents the basic unit of subsistence and a key element in people's coping strategies (Justino 2011). Addressing how situations of violence and insecurity influence the family domain and household childbearing decisions is important to ensure and promote individual and community resilience. Second, lack of focus on fertility highlights gaps in our understanding of differences in vulnerability between women and men in conflict settings. Although men are typically more likely to be affected by conflict in terms of physical morbidity and mortality, women face other insidious challenges and often endure more heavily the burden of diminishing family resources (McKay 1998; Ghobarah, Huth, and Russett 2003; Plümper and Neumayer 2006). For instance, in times of crises impoverished households may prefer to interrupt the education of their young childless women to marry them as a way of reducing family financial "burden" and securing access to alternative means of sustenance (Shemyakina 2011, 2013). In contexts where childbearing is strongly tied to marriage, an acceleration in the timing of union formation is likely to encourage to early childbearing (Khawaja and Randall 2006), a factor commonly associated with various negative health outcomes and educational and socioeconomic disadvantage (UNICEF 2005; Nour 2006). Thus, examining the contribution of conflict to changes in fertility can shed light on the female condition and status in the household and has implications for postconflict development and gender equality. Third, knowledge on how fertility decisions are made during conflict would advance our theoretical understanding of the drivers of contemporary long-term population change. In turn, this could inform family planning, health, and education strategies in conflict-ridden and postconflict settings where 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's dissolution is still widely regarded as a "uniquely peaceful geopolitical catastrophe" (Baev 2007, 250). In reality, the demise of the Union created disaster zones where violence quickly emerged (Broers 2016). This is the case in Azerbaijan, a country historically located at the cross-roads of territorial struggles between Persian, Ottoman, and Russian empires, and which has been embroiled since 1991 in an interstate war, now officially termed a "frozen conflict," with its neighbor Armenia over the Nagorno-Karabakh region. Furthermore, while a number of studies have investigated fertility changes in post-Soviet Central and Eastern Europe (Kohler and Kohler 2002; Macura and MacDonald 2003; Sobotka et al. 2003; Sobotka 2004; Perelli-Harris 2005; Kotowska et al. 2008; Billingsley

2010), and Central Asian republics (Agadjanian and Makarova 2003; Agadjanian, Dommaraju, and Glick 2008; Clifford, Falkingham, and Hinde 2010; Agadjanian, Dommaraju, and Nedoluzhko 2013; Spoorenberg 2013, 2015), the fertility trajectories of countries in the South 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 patterns in the early and late post-Soviet period.

The first aim of this paper is thus to complement and expand existing literature on post-Soviet fertility changes by retracing Azerbaijan's long-term fertility dynamics and describing the nature of their evolution, including aggregate, age- and parity-specific changes. A detailed reconstruction of these trends is required to determine the country's current stage in the fertility transition and to observe whether changes are related in time with conflict hostilities. The second objective is then to specifically address the questions of whether and how exposure to conflict violence was related to changes in fertility. In particular, the study employs birth history data from the 2006 Azerbaijan Demographic and Health Survey (AZ-DHS) and discrete-time survival models accounting for unobserved individual heterogeneity to explore the association between exposure to conflict and the transitions to first, second, and third birth.

Theoretical expectations on the broad conflict–fertility relationship are ambiguous: individuals may accelerate the transition to childbearing to buffer future economic uncertainty, following the loss of a child or for other reasons like nationalist pronatalist motives; alternatively, they may postpone births in hope of better times or because of trade-offs between child quantity and quality. Existing evidence is also inconclusive, possibly because different types of conflict and actors involved (e.g., interstate vs. intrastate violence) trigger different fertility responses (Neal, Stone, and Ingham 2016). Additionally, extant research has so far mainly focused on aggregate trends; that is, on whether conflict-exposed households increase or lower their fertility. This implicitly neglects the fact that the relationship between conflict and childbearing decisions is likely to differ by parity and be linked to the country's stage in the fertility transition.

This article therefore contributes to the theoretical debate by providing evidence from a neglected conflict zone, where the interplay between ethnic and political drives as well as the emergence of nationalist ideologies against the external “enemy” might have translated into higher fertility among the conflict exposed. Moreover, by looking at subsequent transitions, it adds to the literature by examining the hypothesis that the relationship between conflict violence and fertility decisions varies by parity. It shows then that conflict mainly influences the decision to transition to the average parity, here the second child.

Examining fertility responses to conflict violence is consequential for policymaking: for instance, evidence of higher fertility in conflict-affected households would require scaling up the resources for maternal and newborn 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 labor and marriage markets (Urdal 2006). Hence, the results of this study serve as inputs for the design of strategies targeting vulnerable populations such as refugees and internally displaced persons (IDPs) in Azerbaijan as well as in other conflict-prone areas with similar historical past, like Dagestan and Donbass.

The remainder of the paper is organized 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 methodological strategies used in the analyses. I then present the results of trend analyses since independence and of statistical models and discuss them 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.

Background

The conflict and fertility relationship

As Randall argues, “[armed] conflict is part of the human condition and therefore should be integral to all analyses and interpretation of demographic behaviour” (2005, 292). Although research on the demographic consequences of armed conflict has grown substantially, it still concentrates on direct effects; for example, excess mortality, migration, and displacement.¹ The question of how conflict violence affects overall fertility has not attracted comparable attention, though its disproportionate long-term effects on women and the centrality of family support in unsettled times are well known (Ghobarah, Huth, and Russett 2003; Austin et al. 2008; Patel et al. 2016). Empirical knowledge of its impacts at different birth orders is even thinner and has not yet been adequately articulated in theoretical discourses.

Most accounts of the relationship between conflict and fertility are historical studies of the consequences of World Wars I and II on Western European childbearing patterns. These typically document a “pro-cyclical” relationship, whereby wartime fertility drops are followed by postwar compensatory “baby booms” (Hobcraft 1996; Rindfuss and Sweet 2006).

Experiences of conflict-related fertility declines have then been documented in some low- and middle-income countries during the 1990s. In Central Asia, Clifford, Falkingham, and Hinde (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, Gebreselassie, and Chandrasekhar 2009) although only in the short term (Schindler and Brück 2011). 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 research suggests “disruptive” effects of conflict on fertility, some country-specific studies in Middle Eastern and sub-Saharan African countries and, more recently, Latin America provide evidence for the “fertility promotion” hypothesis (see, for instance, Abbasi-Shavazi, McDonald, and Hosseini-Chavoshi (2009) for Iran; Cetorelli (2014) for Iraq; Yucesahin and Ozgur (2008) for Kurdish populations in south-eastern Turkey; Khawaja and Randall (2006) for the Occupied Palestinian Territories; Schindler and Brück (2011) and Kraehnert et al. (2019) for Rwanda, and Castro Torres and Urdinola (2019) for Colombia). A positive relationship is also documented at the macrolevel. For instance, using time-series multicountry information for the 1970–2005 period, Urdal and Che (2013) identified higher aggregate fertility correlated with the presence of armed conflict in low-income countries. Nonetheless, although peaks and troughs in reproductive patterns in conflict settings seem to be common, other studies—whether cross-country (Iqbal 2010) or microlevel ones (Ladier-Fouladi and Hourcade 1997; Saxena et al. 2004)—found no association or fertility response to conflict violence.

Existing studies reveal the complexity of fertility responses to armed violence and point to distinct *direct* and *indirect* mechanisms eliciting them. With regard to direct effects, economic explanations based on the quantity–quality framework (Becker and Lewis 1973) suggest that conflict-induced hardship increases couples’ awareness of the costs associated with each additional child and highlight 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). By contrast, the “risk-insurance” approach to fertility suggests that, under conditions of generalized instability and economic dislocation, replacement fertility operates as a direct intentional coping strategy for households to

preserve or increase their future sources of income and to compensate for the potential loss of already-born children (Verwimp and van Bavel 2005). Sexual violence, especially when used as a weapon of war, can also contribute to increases in the number of (unintended) births (Staveteig 2011).

Indirect mechanisms relate more to psychological and biological factors. For instance, conflict-induced stress and impairment can have unintended disruptive effects on fecundity and reduce the frequency of intercourse, thus lowering overall fertility (Palloni, Hill, and Aguirre 1996). By the same token, the detrimental consequences conflict has on community infrastructures, like roads, water systems, health facilities, can affect the organization 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, as the psychology literature and "attachment theory" propose, that during periods of heightened stress, individual need for emotional and physical support from loved ones may increase frequency of intercourse and thus, indirectly, fertility (Cohan and Cole 2002). Childbearing may also be a way to "normalize" one's life in the face of traumatic events (Carta et al. 2012). Other indirect factors, for example, the breakdown of community institutions, family planning services, and disruption of health systems can also trigger fertility increases (Tabeau and Bijak 2005). Last, but not important, in enduring interstate confrontations, increasing nationalist rhetoric, and the perceived need to maintain a demographic balance with the opposing group can culminate into pronatalist feelings or even population policies encouraging childbearing (Fargues 2000; Abbasi-Shavazi, McDonald, Hosseini-Chavoshi 2009).

Overall, such mixed evidence on the conflict–fertility relationship gives credence to Sillanpää's (2002) view that the demographic impact of armed conflicts varies according to the typology of the conflict, its severity and duration, and across population subgroups. Notably, when it comes to reproduction, this further suggests that differential responses are likely to emerge at different stages of the fertility transition and as a result of pre-existing norms around childbearing. The next sections provide background information on post-Soviet fertility changes to inform expectations on responses to conflict in Azerbaijan.

Post-Soviet transitions and fertility changes

To date, limited evidence on the conflict–fertility relationship has come from former Soviet countries and no study has assessed changes in fertility here that might have occurred in conjunction with interstate armed violence, including the Nagorno-Karabakh conflict in Azerbaijan. More generally, fertility trends and patterns in postindependence Azerbaijan have been largely overlooked. By contrast, extended literature documented the

fertility declines that came about following the collapse of the Soviet Union in countries of Central and Eastern Europe, in some Commonwealth Independent States (CIS) (Kohler and Kohler 2002; Macura and MacDonald 2003; Sobotka et al. 2003; Sobotka 2004; Perelli-Harris 2005; Kotowska et al. 2008; Billingsley 2010) and in Central Asian republics (Agadjanian and Makarova 2003; Agadjanian, Dommaraju, and Glick 2008; Clifford, Falkingham, and Hinde 2010; Agadjanian, Dommaraju, and Nedoluzhko 2013; 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 primarily from timing effects (Sobotka 2004); that is, increasing mean age of first birth. This “*starting-later*” pattern has been attributed to ideational shifts favoring the adoption of “Western” reproductive and family models, including increased individualism and female autonomy (Rabusic 2001; Spéder 2006; Kotowska et al. 2008). Conversely, South-Eastern Europe,³ Slavic CIS,⁴ and Central Asian countries⁵ faced wide social and structural problems which allegedly prevented such ideological shifts. Here, economic impoverishment and uncertainty triggered quantum effects and a “*stopping-sooner*” behavior, leading to birth limitation at high parities and to an increasing proportion of one-child families (Agadjanian and Makarova 2003; Sobotka 2004; Perelli-Harris 2005; Agadjanian, Dommaraju, and Glick 2008; Gjonca, Aassve, and Mencarini 2008; Spoorenberg 2009; Clifford, Falkingham, and Hinde 2010; Shakhotska 2011). The one study on a Caucasian country, Armenia, suggests some parallels with this latter type of response (Billingsley 2011).

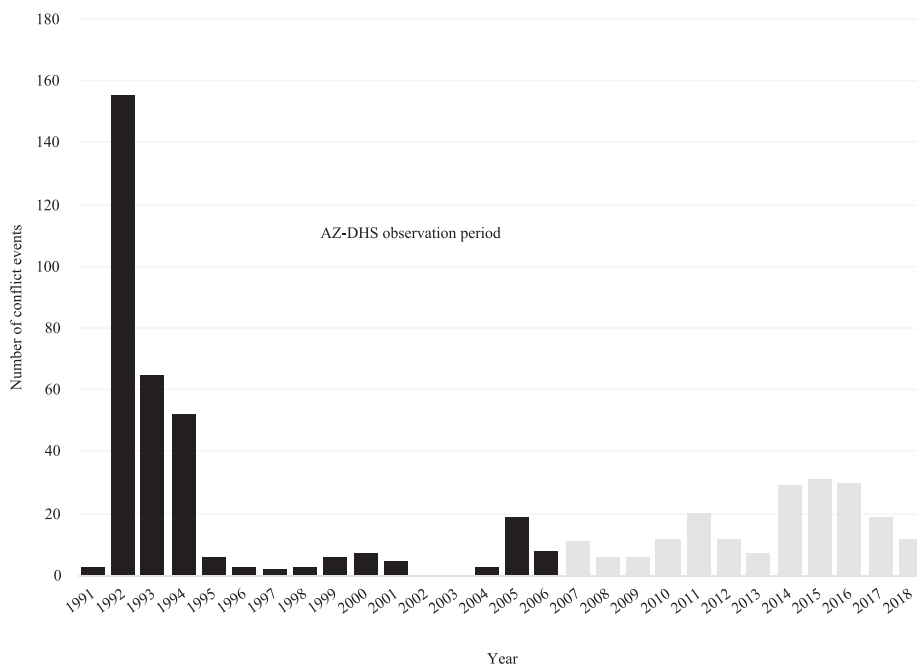
Post-Soviet Azerbaijan: Socioeconomic changes and the conflict with Armenia

Azerbaijan’s early transition period was tumultuous. 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 percent 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 institutionalized corruption, which already affected Azerbaijan during the Soviet era (Clark 1993). However, as opposed to most other former constituent parts of the USSR, in Azerbaijan, a violent struggle for power and space further complicated the path to regime change. For its entire post-independence period, Azerbaijan has been at war with its

neighbor Armenia over the Nagorno-Karabakh region, a landlocked territory internationally recognized as belonging to Azerbaijan (UN Security Council 1993a-d; OSCE 2008; UN General Assembly 2008; Broers 2016), but which Yerevan claims to be an integral part of historical Armenian land (Human Rights Watch 1994; Cornell 2001; Armenia Ministry of Foreign Affairs 2020).⁶

The genesis of tensions between Azerbaijan and Armenia can be traced back to the late 1980s when officials of the then Soviet Nagorno-Karabakh Autonomous Oblast (NKAO) asked Moscow to be incorporated into the Armenian Soviet Socialist Republic (Human Rights Watch 1992, 1994; Cornell 2001; de Waal 2004; Broers 2016; The World Factbook 2017). Pro-unification demonstrations in Armenia were held in Yerevan and in the capital of NKAO Stepanakert (known as Khankendi in Azerbaijani language), triggering the intervention of Soviet troops as well as waves of displacement on both sides. The early stages of the confrontation were characterized by several acts of violence, like the 1988 anti-Armenian retaliatory raids in Baku's industrial suburb of Sumgait, when many Azerbaijanis, including refugees recently arrived from Armenia, attacked the homes of ethnic Armenian residents. The fighting caused 32 official deaths and forced Armenians to flee (Human Rights Watch 1992; Cornell 2001; de Waal 2004). Although disagreement exists on the exact start of the hostilities, most analysts and official sources indicate late 1991⁷ as the beginning of the full-scale war and recognize 1992–1994 as the peak years of hostilities (Human Rights Watch 1992, 1994; International Crisis Group (ICG) 2005; Hopmann and Zartman 2010; Huseynov 2010; Commission on Security and Cooperation in Europe and Washington (CSCE) 2012; Cornell 2015), when most conflict events occurred (Figure 1). The year 1992, in particular, was characterized by several acts of violence, including the Armenian offensive on the Azerbaijani-populated town of Khojali (Human Rights Watch 1992; Pope 1992; Lieven 1992; De Waal 2004; ICG 2005; Goltz 2015). Armenians later seized Shusha, the major city of the Karabakh region, the neighboring district of Lachin, and parts of other Azerbaijani districts adjacent to Nagorno-Karabakh.⁸ In May 1994, the opposing parties signed an armistice agreement which led to the creation of a *de facto* Republic of Karabakh (known as Republic of Artsakh). Since then, though, negotiations have stalled, and a number of ceasefire violations have been registered.

The conflict has caused significant loss of human life. Although the count of fatalities is hard to verify, it has been estimated around 17–25 thousand deaths (U.S. Department of State 1993; Human Rights Watch 1994; Yunusov 2002; De Waal 2004; Cornell 2015; CSCE 2017; UCDP- GED 2019). The scale of forced displacement was even larger. Between 750, 000 and 1,000,000 Azerbaijanis were uprooted from Nagorno-Karabakh or fled Armenia, sometimes under violent circumstances and were displaced across

FIGURE 1 Count of conflict events, Azerbaijan 1991–2018

NOTE: Number of conflict events causing at least one casualty. Darker bars highlight the observation period covered by the AZ-DHS. Note that UCDP-GED started to collect data on the Nagorno-Karabakh conflict in 1991 only. For this reason and, importantly, for consistency with official sources, deaths caused in earlier years are not included.

SOURCE: UCDP-GED (2019).

the territory of Azerbaijan (Human Rights Watch 1994; Yunusov 2002; De Waal 2004; UNHCR 2009; Cornell 2015).⁹ Such a large flow of forced migrants—about 10 to 15 percent of the country’s then total population of 8 million—generated vast 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; Gureyeva-Aliyeva and Huseynov 2011) 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).

While the territorial dispute over Karabakh is often defined as a “frozen conflict” (Grant 2017, 380–382; Parliamentary Assembly of the Council of Europe (PACE) 2015), the sheer scale of suffering and scars it produced are still visible and periodic skirmishes continue to challenge the lives of both Armenian and Azerbaijani civilian populations. Recent years have seen a worrisome increasing trend in conflict incidents (Figure 1) as well as in the number of casualties (U.S. Department of State 2016; UCDP-GED 2019).¹⁰ 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 influence households' childbearing decisions.

Data and measures

When official civil registries are flawed, as may be expected in conflict-affected countries, data from nationally representative surveys can be used to reconstruct fertility patterns, analyze their components, and test empirical associations between a wide range of variables (Woldemicael 2008; Clifford, Falkingham, and Hinde 2010; Cetorelli 2014). In addition, surveys might be preferred in contexts where there is evidence of underregistration of births. As in other parts of the former USSR, underreporting, particularly of female births, occurred in Soviet Azerbaijan, due to registration depending on citizens' initiative, discrepancies in international/Soviet definitions of "live birth" and registration fees (Jones and Grupp 1987; Anderson and Silver 1989; Phillips, Adair, and Lopez 2018).

For these reasons, the primary data source for this study is the AZ-DHS, implemented in Azerbaijan between July and November 2006. The survey collected data on important 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, with a nearly universal response rate. The survey sample was generated in two stages. First, clusters were selected in Baku and in the eight other economic administrative regions of the country from the 1999 Population Census sample frame. In the second stage, households were listed in each cluster and systematically selected.^{11,12} It is important to note that, due to security reasons, the survey covered only selected areas of the contested Karabakh territories (Aghdam and Terter districts and part of the Fizuli district) and did not include the Nakhchivan exclave and the Kelbajar and Lachin districts, the latter two being under the control of Armenian-backed separatist Republic of Artsakh. Figure 2, using georeferenced data from the Uppsala Conflict Data Program Georeferenced Event Dataset (UCDP-GED 2019), shows the spatial distribution of violent events that occurred in the peak years of the conflict and soon after the 1994 armistice in relation to the sampling strategy of the 2006 AZ-DHS. Of the total conflict events occurred between 1992 and 1996 ($n = 298$)¹³, the vast majority (about 81 percent) occurred in the contested region and sampled part of Karabakh. This, together with the fact that entire ethnic Azerbaijani population fled the districts of Lachin and Kelbajar during the war (ICG 2019) (according to the 2005 Census of the Republic of Artsakh (National Statistical Service of Nagorno-Karabakh Republic 2006), only ethnic Armenians—not the focus of this paper—have settled in these districts) should limit issues around sample selection bias and permits the correct identification of those exposed to violence.

FIGURE 2 Map of conflict events, Azerbaijan 1992–1996

NOTE: Areas in light grey indicate the non-sampled Nakhchivan and Kalbajar and Lachin districts. Areas in dark grey delineate the sampled districts of the Yuhari-Karabakh region (Agdam, Terter and Fizuli districts). Larger dots indicate areas with higher number of conflict events causing at least one casualty. All conflict events displayed in the map took place between 1992–1996. All conflict events in the non-sampled exclave of Nakhichevan occurred in 1992 and were coded by UCDP-GED as: “State-based violence between Side A: Government of Azerbaijan and Side B: Republic of Artsakh”.
SOURCE: UCDP-GED (2019).

To determine changes in fertility associated with overall exposure to armed violence, it is necessary to identify the exposed. As the literature on conflict and violence highlights, exposure to conflict can take different forms (Kalyvas 2006; Balcells 2011). Experiences of armed violence can be direct and immediate (e.g., suffering physical aggression, being injured, experiencing house damage or disruption), and/or indirect and more chronic (e.g., forced displacement, geographical proximity to actual fighting/bombings, witnessing the death of loved ones and friends, being the relative of survivors). Although diverse, both types are likely to exert an influence over individual behavior, including over fertility decisions (Plümper and Neumayer 2006; Alsaba and Kapilashrami 2016; Curiel and Bishop 2018). This understanding of conflict exposure forms the basis for how I next operationalize its measurements.

A key feature of the AZ-DHS household questionnaire is that it asked all family members aged 16+ at interview time about their IDP or refugee status. If the individual self-defined as either refugee or IDP, he/she was then asked about his/her previous district or country of residence. This permits the identification of household members and women who have had direct experience of the conflict in Nagorno-Karabakh and who also experienced one of its indirect ramifications; that is, forced displacement from the con-

tested territories or migration from Armenia.¹⁴ Further, the survey provides information on respondents' current place of residence and on the length of their stay in that location. I use this information to identify women who have "always" lived in sampled conflict-torn districts of Karabakh (Agdam, Terter, and Fizuli) or moved to these areas before the conflict erupted in full scale. While these women did not experience conflict-induced displacement and, perhaps, might not have been as explicitly involved with disruption or killings (although Figure 2 shows that conflict events causing at least one casualty occurred all across the sampled part of Karabakh), they likely experienced recurring and more subtle conflict-related uncertainty (e.g., fear of coercive acts, land mines, land expropriation, or simply of warfare extending to their territories), precisely because of their residential proximity to the conflict line. It is again worth stressing the relevance of this differentiation as experiences of conflict violence and family-related decisions can be expected to vary between forced migrants and stayers. Moreover, including women who likely mainly had indirect experiences of violence is important as it allows to more confidently attribute behavioral responses to other, more hidden aspects of violence, like uncertainty and fear, that reasonably have been experienced by a large subgroup of the population.

I thus exploit this valuable survey information to construct two different conflict exposure indicators 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 Karabakh territories (or migrated there before the conflict erupted) and (ii) women who self-identified 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 family-size decision-making is the result of an interaction process between the individual preferences of each partner, and thus a choice jointly taken at the household level (Stein, Willen, and Pavetic 2014). Although women are the main agents and reporters of childbearing events, in a patriarchal society like that of Azerbaijan, limiting the measure to women's conflict status only may not fully capture the influence of conflict on fertility decision-making. Exposed women are then compared to nonexposed women, that is women who were not directly exposed to violence from the Karabakh conflict or did not have indirect experience of it as they lived farther away from the conflict zone.

It is here worth mentioning that several studies addressing conflict effects on individual outcomes take advantage of the georeferenced nature of many household surveys and link them to subnational data on conflict violence from datasets like the UCDP-GED to create continuous indicators of conflict intensity (see, for instance, Østby (2016) or Lindskog (2016) among others). Unfortunately, the AZ-DHS did not collect fine-grained georeferenced cluster data that would allow constructing similar measures. Even at

a higher spatial scale, AZ-DHS data are not comprehensive enough to obtain precise matching. For instance, information on district of residence are not available for all women: while it is possible to trace back the origin district of IDPs before they fled Nagorno-Karabakh, the AZ-DHS only provides numerical information on the current district of residence of other women, including refugees from Armenia. This means that we know their economic region of residence (e.g., Yukhari Karabakh, Aran, Ganja Gazakh, Baku, and so on), but not their specific district in that region.¹⁵ The fact that the area size of these economic zones is substantially large¹⁶—together with the lack of full migration histories—makes super district-level linkage with conflict data hardly useful and prone to large measurement error. For these reasons, I opted for measures mainly based on individual self-reported conflict status and on geographical location only for those who never left the sampled conflict districts. Evidently, favoring a more conservative measurement over a more detailed one also reduces my capacity to distinguish women who, for instance, lived in the few conflict-affected districts in the economic region of Ganja Gazakh (North West) bordering Nagorno-Karabakh from those who did not, but resided in the same region. Non-IDP/refugee women (as well as women whose husband was not affected by the conflict) in these regions are therefore all coded as nonexposed. Nonetheless, the fact that the vast majority of conflict events occurred in the sampled Karabakh districts should help to limit errors in the correct attribution of conflict exposure.

Table 1 presents the background characteristics of samples of ever-married women in Azerbaijan by conflict status used in the statistical analyses.¹⁷ Despite the diverse experiences of violence, conflict-exposed and nonexposed women do not largely differ in their fertility-related characteristics. For instance, both groups report similar averages of children ever born (about 1.70 per woman), except those residing in the Karabakh region (1.88 children per woman). There is a difference in age at marriage across differently affected groups, with exposed women marrying slightly, but significantly later than nonexposed ones (21.30 vs. 22.01). No marked differences, by contrast, emerge across conflict groups in terms of age at first and subsequent births, although nonexposed women have children slightly earlier (but not significantly so) than their more exposed counterparts. The groups show more diverging socioeconomic profiles. Conflict-exposed women are more urbanized than the nonexposed, IDPs, and refugees especially. By contrast, residents in the Karabakh region are disproportionately more rural. This is expected, as according to official data collected around the time of and some after the implementation of the 2006 AZ-DHS, around 70 percent of IDPs and refugees in Azerbaijan resided 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 differences among the

TABLE 1 Key summary statistics of AZ-DHS weighted samples of ever married women by conflict status

	Nonexposed	Exposed	Difference	<i>p</i> -value	IDP/ refugee	Karabakh residents	Total
Residence type (%)							
Urban	53.27	61.36	8.09	0.154	72.32	11.77	54.38
Rural	46.73	38.64			27.68	88.23	45.62
Education (%)							
Secondary or less	70.97	66.91	4.06	0.542	66.11	70.51	70.41
Secondary special	15.98	19.63	-3.65		19.95	18.95	16.48
Higher	13.05	13.46	-0.41		13.94	11.94	13.10
Age (mean, years)	28.72	28.94	-0.22	0.612	28.81	29.51	28.75
Age at marriage (mean, years)	21.30	22.01	-0.71	0.038	21.94	22.30	21.40
Age at first birth (mean, years)	22.35	22.88	-0.53	0.067	22.77	23.38	22.43
Age at second birth (mean, years)	24.84	24.98	-0.14	0.372	25.01	24.83	24.86
Age at third birth (mean, years)	27.21	27.68	-0.47	0.438	27.91	27.01	27.26
Children ever born (mean)	1.70	1.69	0.01	0.908	1.65	1.88	1.70
First child died in conflict years (%)	1.33	1.76	-0.43	0.624	2.00	0.62	1.39
Second child died in conflict years (%)	1.63	2.82	-1.19	0.525	2.78	2.88	1.77
Percentage in sample	82.41	17.59			8.89	8.70	100

NOTE: Exposed women are defined using the "broad" definition of conflict exposure. The IDP/refugee sample includes women who did not live in the 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. The sample is restricted to women exposed to the risk of first birth in calendar years 1992-2006. *p*-Values are reported for tests of difference in means or proportions.

SOURCE: 2006 AZ-DHS.

groups are also noteworthy. While the least educated group is the Karabakh residents, the differences with the nonexposed is not large and IDP/refugees are the most educated. Nonetheless, differences are not statistically significant. Furthermore, the Soviet legacy of high literacy is visible across all subgroups, with only 2 percent of women in the overall sample reporting not having completed primary schooling.

Taken alone, Table 1 suggests only modest conflict-related differences in socioeconomic and fertility background. However, these numbers 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.

Methods

The first aim of this study is to retrace Azerbaijan's fertility history and understand the mechanisms driving changes; for example, whether they conform more to a "stopping-sooner" or a "starting-later" behavior. Data from the AZ-DHS can be used to reconstruct annual fertility rates for the 15 years before the survey (Schoumaker 2013). For a woman aged x ,¹⁸ in calendar year t , the fertility rate is

$$F_{x,t} = \frac{B_{x,t}}{W_{x,t}} \quad (1)$$

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 percent confidence intervals for $F_{x,t}$ (Schoumaker 2013; Pullum 2006). Yearly estimates of total fertility (TFR) are calculated for all women, for conflict-exposed and nonexposed women. I also compute total marital fertility rates (TMFR) for comparative purposes. 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 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) (Ni Bhrolcháin 1987).¹⁹ The risk of selection due to censoring inherent to the SCM is here minimized as changes in this incremental aspect of childbearing are explored over a relatively limited time frame—that is, 1991–2005.

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 over time. Specifically, the model chosen to analyze the three transitions is a discrete-time logit model accounting for unobserved heterogeneity ("frailty") at the woman-level (Allison 1982). In its general form, the model can be expressed as

$$\log \left(\frac{\pi_{t,i}}{1 - \pi_{t,i}} \right) = \alpha D_{t,i} + \beta X_i + \gamma P_{t,i} + v_i \quad (2)$$

where $\pi_{t,i}$ is the probability for woman i of experiencing the event during interval t , provided that she has not yet experienced it. $D_{t,i}$ is a vector of functions of the cumulative duration by interval t with coefficients α . This is specified by breaking the hazard function 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. The duration categories were chosen to best describe the shape of the baseline hazard which changes quickly at the beginning of the interval (e.g., after marriage in the case of the transition to the first birth) and then diminishes less rapidly. Time is measured in years, as common in fertility analyses. The choice of this timescale (years instead of months) is also guided by the fact that interest lies in the effect of macrolevel political changes which, even in rapidly transforming conflict settings like independent Azerbaijan, unfold gradually over time (Agadjanian, Dommaraju, and Glick 2008). X_i is a set of time-invariant individual-level covariates with coefficients β and $P_{t,i}$ is a vector of dummy variables representing calendar year effects. These are time-varying since women are exposed differently to historical periods as they move forward through the risk of giving birth. To avoid any time-ordering problem and more accurately test whether conflict exposure was associated with fertility outcomes, analyses start in calendar year 1992. This allows taking into account the gestation period for births conceived in the earliest phases of the conflict and making sure that births happened before the conflict broke out do not affect the estimates.²⁰

The main predictors of interest are thus calendar year and the conflict exposure variable (in its “broad” definition, as interest lies not just in the woman’s experience, but that of the household as a whole as explained above), as well as the interaction between the two. For second and third births, I also include a variable capturing the relation with experience of child death during key conflict years (1992–1995) as a way to explore the replacement mechanism. 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 ensure 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 births for following births), residence type (urban or rural), and education. This latter is constructed as a three-level variable following Agadjanian, Dommaraju, and Glick (2008) and reflecting the Soviet education system: general secondary or lower; vocational, alternatively known as specialized secondary (*tekhnikum* 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 (Meslé, Vallin, and Badurashvili 2005; Yüksel-Kaptanoglu et al. 2014). Models are estimated for the sample of all women as well as for subsamples of women exposed or nonexposed to violence to explore

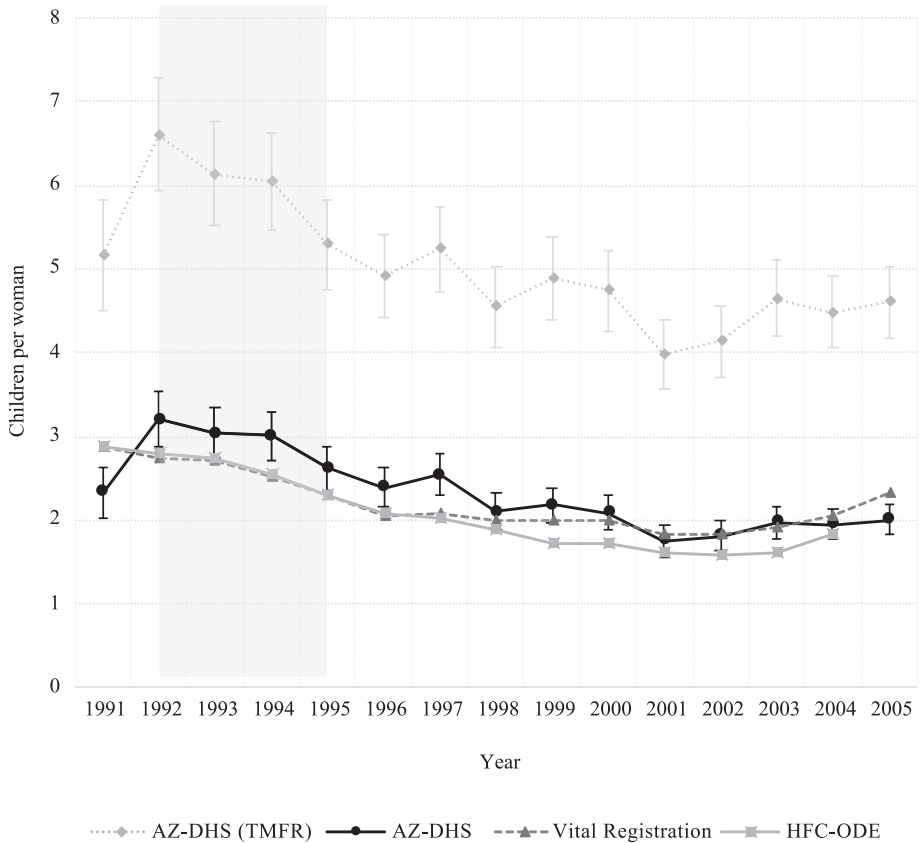
whether the effect of certain covariate, for example, child death, varied within groups with different exposure to the conflict.

Lastly, v_i represents the woman-specific “frailty” term, which accounts for unobserved heterogeneity attributable to individual time-invariant unknown risk factors. For each individual, v_i represents a set of unmeasured characteristics randomly drawn from a normal distribution with variance σ^2_v (Steele 2008).²¹ This is interpreted as the residual variance between women that is due to unmeasured time-invariant attributes. Including woman-specific unobserved individual heterogeneity in the study of transitions to the i th birth is important because omitting some unobservable variables²² 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 estimation 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. Unobserved heterogeneity is therefore included to avoid the emergence of such model specification issues.

Given that childbearing outside wedlock is particularly rare in Azerbaijan and that most women marry by their early 20s, women aged 16+²³ are observed from their date of marriage until the date of first birth or interview for the first transition,²⁴ whichever comes first. Those who gave birth before entering into official union are thus excluded from the analyses (0.80 percent, $n = 43$). For second and third births, exposure starts 7 months after the previous birth to allow for the effects of lactational amenorrhea.²⁵ 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 ethnic 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 postindependence years and of Armenians (Aliyev 2006). Hence, as interest lies in the titular population, outward migration should not represent a major issue.

FIGURE 3 Total fertility rate and total marital fertility rate, Azerbaijan 1991–2005



NOTE: Shaded area highlights key conflict years.

SOURCE: TransMonEE vital registration data (women aged 15–49), Human Fertility Collection (ODE Collection) and 2006 AZ-DHS (women aged 16–39).

Retracing fertility trends in postindependence Azerbaijan

Figure 3 displays trends in TFR for all women in Azerbaijan from independence to 2005 as estimated from the AZ-DHS and compared with official estimates from vital registration²⁶ and fertility estimates as compiled by the Human Fertility Collection (HFC) ODE database²⁷ (MPIDR and VID 2018). In general, sources provide considerable evidence of period fertility decline since independence in 1991, although vital registration and survey estimates converge only at the start of the new century, suggesting under-registration of birth in the postindependence and conflict years. A small, but noteworthy, opposite mismatch between these two sources appears in the past years of observation, with the latter reporting higher fertility than

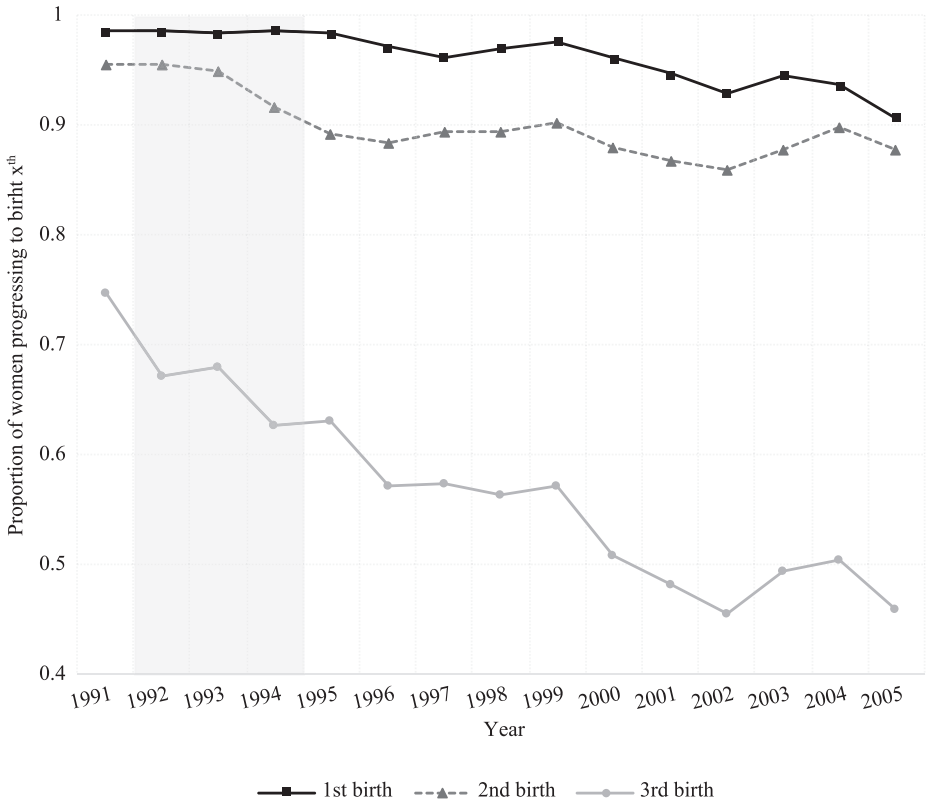
survey estimates. This could be due to increased fertility rates in women aged 35–49, whose fertility is only partially captured by estimates calculated retrospectively from the AZ-DHS (see Figure 6), between 2003 and 2005.²⁸ The somewhat lower estimates provided by the HFC-ODE database for the first part of the new century are likely to be the result of the methodology used to calculate such rates. Despite these small differences, sources follow a similar trend.

Overall, the number of children per woman moved from above 3 in 1992 (as estimated from the AZ-DHS) to below replacement at the start of the new century (1.75 in 2001, 95 percent CI 1.56–1.93) with then TFR plateauing at around two children per woman in the most recent observation years. The declining trend in TFR of the 1990s is visibly mirrored in annual estimates of TMFR (Figure 3). In the postindependence years and at least until the start of the new century, period marital fertility rates almost halved, closely following the behavior of overall fertility. In general, the decline is most evident between 1992 and 1996, reflecting lower conceptions during years marked by conflict and economic downturn. With the start of the new millennium marital fertility experienced a larger increase than TFR, but then similarly stabilized at around 4.5 children per married woman towards the end of the observation period.

PPRs, presented in Figure 4 using 3-year moving averages to smooth annual fluctuations, 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 delayed first birth. 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 a declining tendency 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 except for some decline during conflict years. Third-order progression instead was characterized 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, at least initially, the major characterizing force for fertility declines in Azerbaijan was that of a “stopping-sooner” behavior in years characterized by deteriorating economic conditions and conflict violence. This fast-declining tendency to have a third birth, coupled with the fact that, at least until 2002, virtually all women in Azerbaijan had a first birth after marriage (about 92 percent) sets up parity two as the key birth-decision in this context.

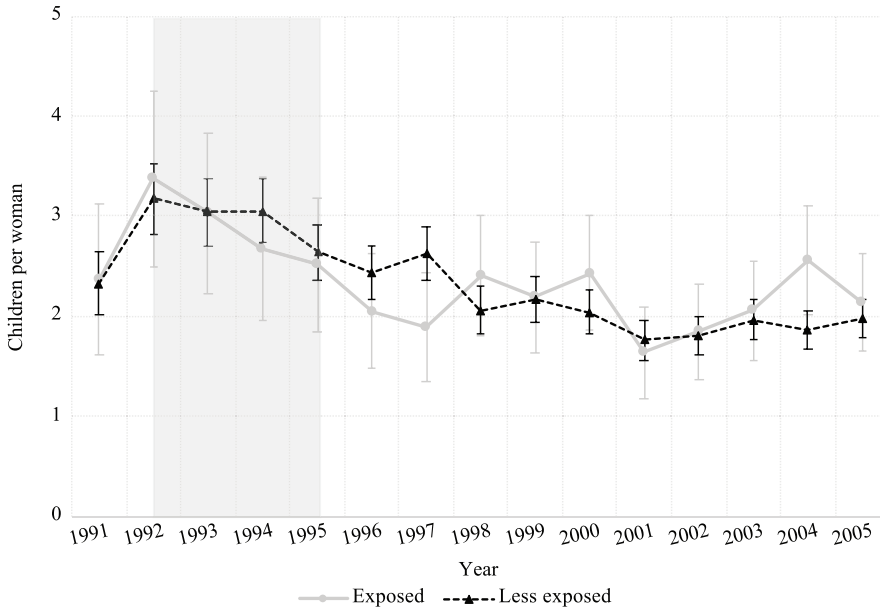
To explore more in detail whether conflict violence had any effect on fertility, I estimated TFR from the AZ-DHS for exposed and nonexposed women (Figure 5). First, while both groups experienced an overall decline

FIGURE 4 Parity progression ratios, Azerbaijan 1991–2005



NOTE: 3-year moving averages. Shaded area highlights key conflict years.
 SOURCE: 2006 AZ-DHS (ever married women).

in fertility, the drop during peak conflict years is more visible and continuous for exposed women. For this group, the decline extended to 1997, when the TFR point estimate dipped below the replacement level. This was largely the result of declining rate among adolescent and young adult exposed women (Figure 6).²⁹ For instance, fertility dropped from about 224 children per 1,000 exposed women aged 20–24 in 1992 to 150 in 1996. Rates for the nonexposed declined at all ages (except for adolescents), but less rapidly for young adults, suggesting age-related different responses in times of violence and dire economic conditions. After 1997, trends for the exposed become more erratic. While the lowest estimated TFR value for both groups was in 2001 (about 1.65 children per woman), since then there is evidence of compensatory rises among the more conflict-exposed, adult women in particular. Nonetheless, confidence intervals for the two groups overlap in all years, indicating no significant differences in total fertility during the studied period.

FIGURE 5 Total fertility rate by conflict exposure, Azerbaijan 1991–2005

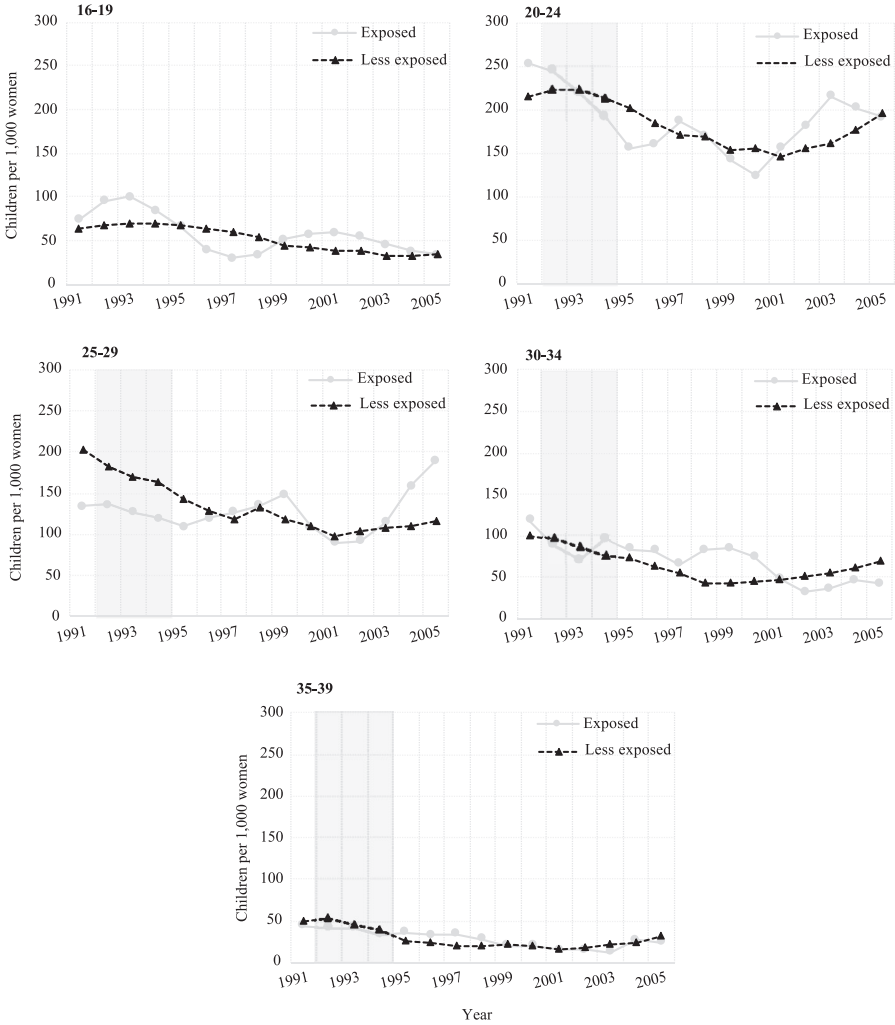
NOTE: Exposed women are defined according to the broad definition. This includes women who (i) always resided in Karabakh, (ii) self-identify as refugees from Armenia/IDPs from Nagorno-Karabakh or (iii) were not refugees or IDPs, but whose husbands were.
SOURCE: 2006 AZ-DHS (women aged 16–39).

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” behavior at parity three and incipient first birth postponement towards the end of the observation period. An established falling propensity to have a third birth, accompanied by almost universal transition to motherhood, leads to the hypothesis that—if the relationship between conflict and fertility indeed differs by parity—then the influence of violence should be strongest on the decision to transition to the second birth in this context. As aggregate measures of fertility computed for long periods of time though may not be robust enough to detect the underlying trend of the decline and to fully capture the effects of conflict at different birth orders, I next assess this hypothesis with event history analyses.

Table 2 summarizes the main results of discrete-time logit models for all transitions estimated for three sample groups: all women, conflict-exposed women, and nonexposed women, defined as per the “broad” definition of conflict exposure.³⁰ Each transition is discussed separately in the following subsections.

FIGURE 6 Age-specific fertility rates by conflict exposure, Azerbaijan 1991–2005



NOTE: 3-year moving averages. Exposed women are defined according to the ‘broad’ 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.
 SOURCE: 2006 AZ-DHS (women aged 16–39).

Transition from marriage to first birth

The analysis starts by presenting the odds ratios for the transition to the first birth after marriage. Results from the full all women sample model (Table 2, Panel A, Column *a*) show that, although the odds of having a first birth after marriage in any given year is about 14 percent higher for women exposed to conflict, the difference with nonexposed women is not statistically

significant. As it could be expected from populations where the fertility transition is realized via reductions at high parities, there is no evidence of decline in the risk of first birth across calendar years relative to 1992—the year when conflict hostilities erupted in full. Rather, year effects point towards significant increases, particularly in the early postconflict period as well as in the early 2000s. For instance, the odds of transitioning to a first birth in 1998 and 2002 for women (with the same unobserved characteristics) are, respectively, almost three times and 76 percent higher than in 1992 (Column *a*). These results suggest that, at least until the first years of the new century, motherhood was still a universal phenomenon in Azerbaijan. To explore whether year effects then differed within each conflict group, I first estimate models for each conflict subsample separately (Columns *b* and *c*). Results show increases in first birth probability in both exposed and nonexposed subgroups in the early conflict and postconflict years. However, these positive associations are significant only within the group of nonexposed women. In the subsample of women exposed to conflict hostilities, the positive increase is only observed in 1998. Lastly, to further explore the impact of conflict in specific tumultuous years, I reestimated the all-women sample model now adding an interaction term between calendar years and the conflict exposure variable (see Table A1, Column *d* in online Appendix A containing supplementary material). The results of the interaction can be best visualized in Figure 7. Overall, although the trend for the most affected by the hostilities is more erratic and characterized by wider fluctuations, the groups largely follow a similar pattern, indicating no significant difference in the association with calendar year by conflict exposure, neither during the conflict period nor in the posttruce years. Interestingly, by the end of the observation period, first birth probabilities for the more exposed are similar to those observed at conflict onset and very close to those of the nonexposed.

With regard to the other variables included in the models, the risk of first birth is only significantly associated with age at marriage, and its effect is curvilinear: the odds of experiencing a first birth increase substantially to then decline as marital age increases. By contrast, place of residence or education have no association with the risk of transitioning to the first birth (for results of all covariates, see Table A1 in Appendix A).

In brief, being exposed to conflict does not appear to influence the probability of having a first birth after marriage. Conversely, what emerges is a trend of unchallenged universal motherhood in Azerbaijan that persisted at least until the start of the new century. Only towards the end of the observation period there are mild indications of incipient first birth postponement and convergence in probability between women exposed differently to the conflict.

TABLE 2 Odds ratios of first, second, and third birth, ever married women by conflict status

	All women	Nonexposed	Exposed
Panel A: First birth conflict exposure (ref: no)			
Yes	1.145		
Calendar year (ref: 1992)			
1993	1.683*	1.626*	2.692
1994	1.890**	1.904**	2.370
1995	1.673	1.569	3.954
1996	1.423	1.574	1.054
1997	2.199**	2.195*	3.048
1998	2.800***	2.848**	3.872*
1999	1.468	1.552	1.922
2000	1.197	1.192	1.569
2001	1.238	1.110	2.591
2002	1.765*	1.698	2.830
2003	1.712	1.528	4.648
2004	1.102	1.148	1.093
2005	0.170***	0.133***	0.568
σ_u^2	2.642	3.179	1.074
$N_{w,y}$	5349	4650	699
Panel B: Second birth			
Conflict exposure (ref: no)			
Yes	1.417***		
Calendar year (ref: 1992)			
1993	0.818	0.851	1.052*
1994	0.847	0.822	1.064*
1995	0.682*	0.705*	0.425
1996	0.654*	0.689*	0.422
1997	0.623*	0.660*	0.414
1998	0.670*	0.701*	0.521
1999	0.705*	0.709	0.717
2000	0.433***	0.464***	0.274*
2001	0.562**	0.576**	0.431
2002	0.619*	0.620*	0.549
2003	0.608**	0.605**	0.608
2004	0.692	0.694	0.654
2005	0.107***	0.100***	0.134**
First child died during conflict years (ref: no)			
Yes	2.378*	0.435	6.715***
σ_u^2	0.149	0.100	0.486
$N_{w,y}$	8630	7545	1085
Panel C: Third birth			
Conflict exposure (ref: no)			
Yes	0.855		
Calendar year (ref: 1992)			

/...

TABLE 2 (continued)

	All women	Nonexposed	Exposed
1993	1.041	1.105	0.699
1994	0.743	0.802	0.439
1995	0.738	0.795	0.452
1996	0.877	0.976	0.418*
1997	0.703	0.767	0.386
1998	0.764	0.826	0.461
1999	0.548**	0.623	0.212*
2000	0.633*	0.719	0.256*
2001	0.452***	0.534**	0.135**
2002	0.544**	0.595*	0.306*
2003	0.669	0.760	0.291*
2004	0.661*	0.675	0.541
2005	0.304***	0.300***	0.311*
Second child died during conflict years (ref: no)			
Yes	8.330***	7.841***	20.032***
σ_u^2	0.014	0.031	0.006
$N_{w,y}$	19730	17182	2548

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

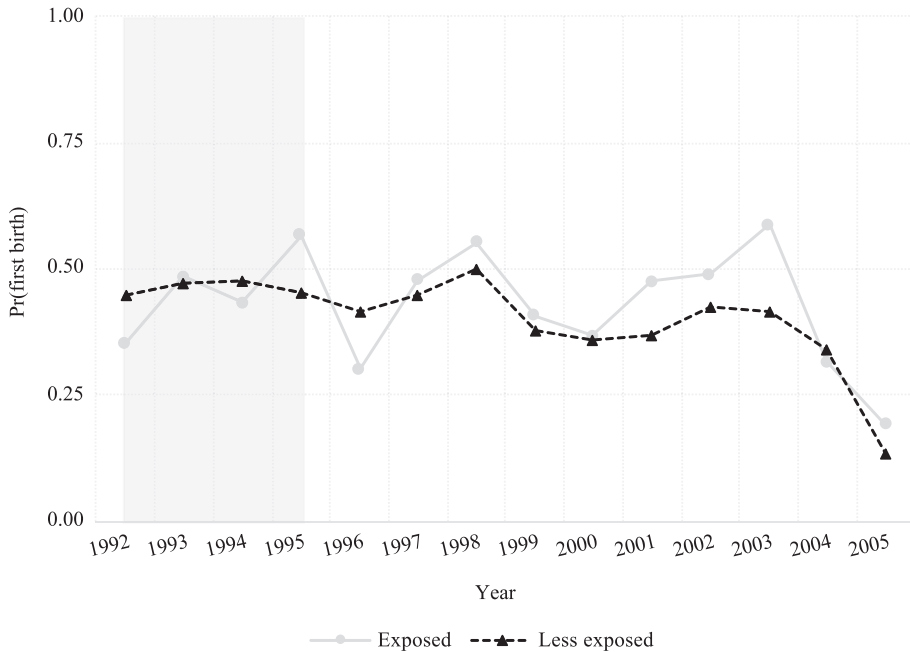
NOTES: All regressions control for time since start of exposure (<2, 3–6, 7–10, 11+ years), education (secondary or less, secondary-special, higher), residence type (urban, rural), age at marriage (linear and squared) for first birth, age at first birth and at second birth, sex of the previous child for second and third birth, respectively. $N_{w,y}$: number of years of exposure in total analysis period for sampled women. Regressions are all specified with frailty terms at the woman level. Subjects enter analysis at date of marriage for first birth and 7 months after the previous birth for subsequent births. Extended tables are reported in Appendix A.

SOURCE: 2006 AZ-DHS. Columns represent exponentiated coefficients (odds ratios).

Transition from first to second birth

Panel B 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 nonexposed conflict 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 (Column *a*). In particular, for women with the same unobserved characteristics, the odds of experiencing a second birth are 42 percent higher for respondents exposed to violence than for those who were not directly affected by the Nagorno-Karabakh conflict. Effect size remains large and significant in all model specifications (see Table A2 in Appendix A) as well as when controlling for regional differences in fertility.³¹ Furthermore, all things equal, the odds of transitioning to a second birth are about 2.38 times higher if women experienced child death during key conflict years. When models are estimated for exposed and nonexposed women individually, I observe that the loss of a child during conflict years significantly and substantially affected the probability of having a second birth (about 6.7 times higher) in the group of exposed women only, providing indications of replacement of children lost during conflict periods.

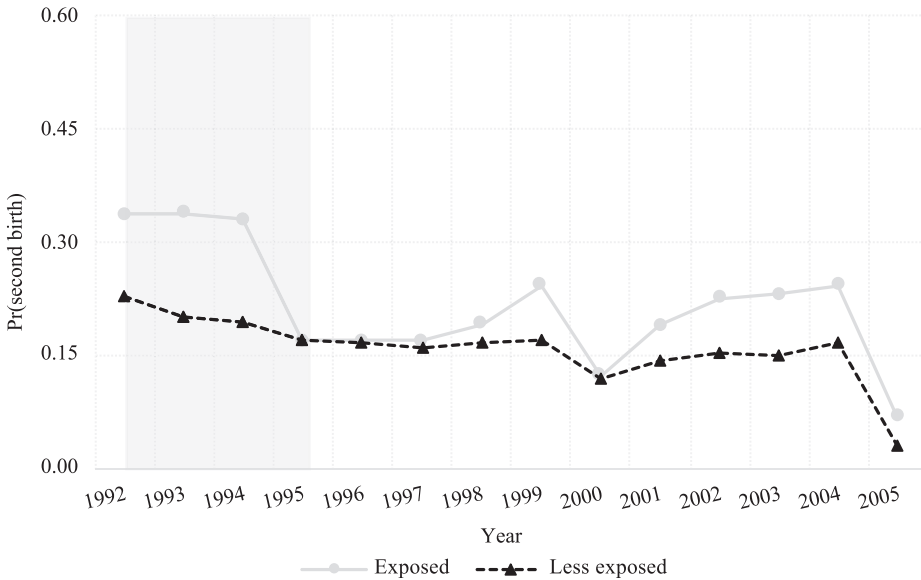
FIGURE 7 Predicted probabilities of first birth by conflict exposure interacted with calendar year



SOURCE: As for Table A1. Other predictors are set to their mean values. Shaded area highlights key conflict years.

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. Yet, models for each conflict subgroup (Panel B, Column *b* and *c*) show some differences in the effect of calendar period, especially in years characterized by violence: although the odds of transitioning to the second birth compared to 1992 declined in each year following independence in the all women sample, the conflict-specific models show that in practice the drop in second birth probability was significant among the nonexposed to violence only. This group experienced a general smoother and essentially continuous downward trend. In contrast, a 5–6 percent increase in risk is observed for the more exposed in 1993–1994, reflecting higher conceptions and births at the beginning and during the full-scale conflict. Hence, to further test period differences between conflict-exposed and nonexposed women, I reestimate the all-women sample model with an interaction between the two variables (Table A2, Column *d* in Appendix A). Figure 8 graphically presents the results in the probability metric. Again, there is evidence of significant increases in the probability of transitioning to the second birth in years characterized by violent conflict for women exposed to such fighting. In the posttruce years (1994 onwards),

FIGURE 8 Predicted probabilities of second birth by conflict exposure interacted with calendar year



SOURCE: As for Table A2, Column d in Appendix A. Other predictors are set to their mean values. Shaded area highlights key conflict years. Note that the y-axis tops at 0.60.

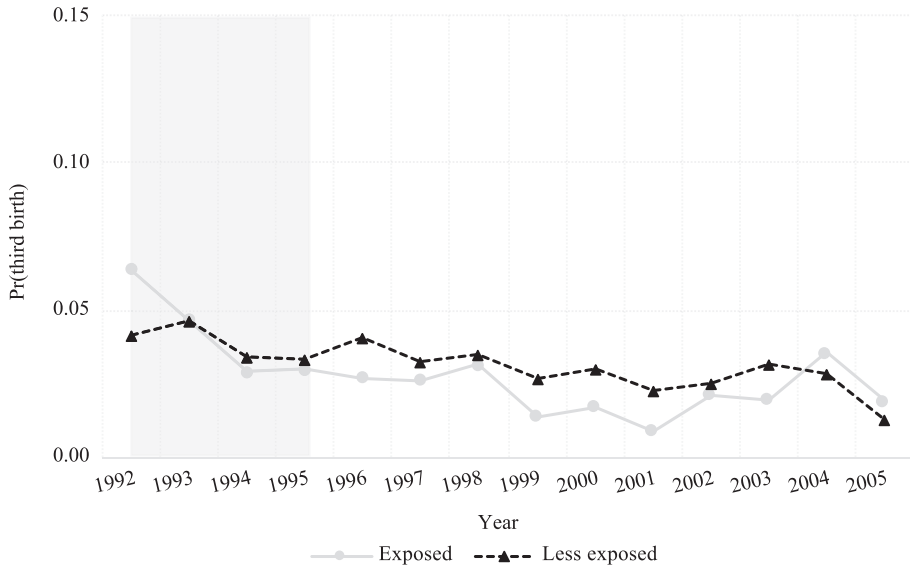
the difference in year effects vanishes, although in the early 2000s there is a steady surge in second birth probability across both conflict groups, possibly more marked for the exposed.

As for other covariates, there are significant negative associations between high education and age at first birth and the probability of progressing to a second birth (see Table A2 in Appendix A). Rural background is a strong predictor in all models, increasing the odds of second birth over urban by about 62 percent in the all women sample models and by 82 percent in the conflict-exposed subsample. The sex of the first child is another important covariate influencing the propensity to have a second child in Azerbaijan: the odds for women whose first child was female are 8 percent higher than for women who had a boy. Yet, such effect is only detected among nonexposed women, suggesting that patriarchal values more than conflict-related motives feed the idea of the “added” value of having a son.

Transition from second to third birth

The main results for analyses on the transition to third birth are reported in Panel C of Table 2. As for the first birth, the risk of having a third child is not significantly associated with exposure to conflict violence, controlling for calendar year and other covariates. However, results show that the risk is eightfold for women who reported experience of child death during conflict

FIGURE 9 Predicted probabilities of third birth by conflict exposure interacted with calendar year



SOURCE: As for Table A3, Column d in Appendix A. Other predictors are set to their mean values. Shaded area highlights key conflict years. Note that the y-axis tops at 0.15.

years, the second proxy used to assess exposure to traumatic conflict-related events. The impact of child loss during conflict years is strong across all the models, but is appreciably 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 percent), 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, and sex composition of previous offspring are all significantly and positively associated with the probability of having a third birth in the Azerbaijani population as a whole and in the nonexposed group. Except the sex of prior children, these variables correlate, albeit more mildly, with the risk of transitioning to the third child for exposed women (see Table A3 in Appendix A).

There are some small, yet noteworthy different temporal trends by conflict exposure. Over the conflict years, there are no significant period differences in the risk of transitioning to the third birth in all groups, although predicted probabilities from the model with the year-exposure interaction (Figure 9) show a large decline for more exposed women between 1992 and 1994. In the postconflict years, though, the downward trend becomes significant earlier and is more pronounced in this latter group: the likelihood of a third birth was already about 60 percent lower in 1996 than in 1992 for

women exposed to the conflict and continued to decline until the first years of the new century, when it starts to display a rising trend. By contrast, in the nonexposed group there is evidence of a significant “stopping sooner”-type of behavior around the early 2000s only, suggesting that most of the decline for this parity transition had been achieved before conflict onset.³²

Alternative measures and robustness checks

To further explore the strength of the above results, I estimate the all-women sample model for all 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” (see Table B1 in Appendix B).³³

A dichotomous identification of conflict exposure 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 districts 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, that is for nonexposed women, never migrant women residing in the Karabakh region and for IDP/refugee women who were forced to abandon their homes due to conflict. Tables A4, A5, and A6 in Appendix A report the results for the three transitions.

The estimated odds ratios suggest that indeed different behaviors 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 41 and 45 percent higher) for the conflict groups as compared to the nonexposed population. This remains true when the year/exposure interaction is included in the model (see Table 5, Column *b*). Again, the effect of particularly tumultuous years (e.g., 1992–1994) on the transition to the second birth is different for both refugee/IDP and Karabakh residents as compared to nonexposed. When models are estimated separately for each conflict group subsample to explore whether the relationships with covariates varies by conflict exposure, I observed that replacement effects for the first children died during conflict years are only visible in the IDP/refugee subgroup. Similar to models using a dichotomous definition of conflict exposure, the probability of transitioning to the third child does not vary between different conflict subgroups and the nonaffected population, but the effect of child loss is sizable in the subsample of IDP/refugees. Notably and differently from before, the odds of having a first birth are significantly higher (about 42 percent) for women living in the Karabakh region compared to

nonaffected women. For IDP or refugee women, such risk at any given time is not different from that of the nonexposed. Hence, a binary definition hides 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, can influence households' decisions on the first birth already.

Limitations

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 be analyzed only 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 socioeconomic and demographic covariates as well as by allowing for unobserved heterogeneity among women. Another similar issue that could affect fertility estimates relates to the occurrence of selective outward migration before survey implementation. As noted earlier, however, international emigration from Azerbaijan following the collapse of the USSR concerned principally ethnic Russians and Armenians (Aliyev 2006), who are not the focus of this study. More generally, assessments and simulations have also shown that the bias in retrospective estimations of fertility resulting from selective migration tends to small (Abbasi-Shavazi 1997; Spoorenberg 2014).

Second, for as much as birth histories reveal historical trends in fertility, DHS data do not permit a more detailed examination of changes in the socioeconomic 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 disentangle the effects on childbearing outcomes of conflict-caused economic dislocation and of the economic downturn due to the collapse of the USSR. 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.

Lastly, seeking to understand the different pathways through which conflict is associated with childbearing outcomes by looking at different population subgroups inevitably exposes the research findings to possible estimation issues due to small sample size. Unfortunately, this also narrows the amount of sub- and fine-grained analyses I am able to perform. It would

have been interesting, for instance, to create a separate indicator and estimates for the group of women who were not IDP/refugees themselves, but who were married to one and explore differences for each transition specific to this subgroup; equally, to differentiate the effects for refugees who came to Azerbaijan at different stages of the conflict. Yet, the small sample size—which further reduces at each transition—and lack of detailed migration histories preclude sensible estimations of this kind. More broadly, although the effect size on the second birth is large and results are consistent in the robustness checks, this constraint highlights one of the reasons why conflict influences on fertility and driving mechanisms are scarcely studied at the microlevel. More efforts are required to develop new or expand existing survey tools (e.g., simple oversampling of conflict-exposed populations and wider number of conflict-related questions in questionnaires) that can help researchers better identify those exposed to violence as well as the type of violence they experienced (Brück et al. 2016).

Discussion and conclusion

This study is the first to provide a detailed account of fertility changes in Azerbaijan since independence and to directly investigate the association between armed conflict and childbearing outcomes in the post-Soviet world. 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 postindependence 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” behavior in the early postindependence 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 and in ex-Soviet Central Asian republics, for instance, the early 1990s were characterized, as well, by fertility declines engineered via limitation of higher order births rather than birth postponement (Agadjanian 1999; Agadjanian and Makarova 2003; Clifford, Falkingham, and Hinde 2010; Billingsley 2011). 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; Spoorenberg 2013; Billingsley and Duntava 2017). Net of conflict effects, this biphasic 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 point towards this direction. After dipping below two children per woman, between 2002 and 2005—when Azerbaijan’s economy expanded and experienced steady trade surpluses (World Bank 2014)—period fertility stabilized around the replacement level with starting signs of slower progression to parity one 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 microlevel information than the survey data used in this paper are required to further explore the hypothesis of a biphasic model of fertility transition, understand its current underlying mechanisms, and, importantly, investigate how they play out among Azerbaijan’s various conflict subgroups.

Beyond understanding Azerbaijan’s postindependence fertility trajectories, I also examined in greater 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 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 (Nepal, Halla, and Stillman 2018). By contrast, I addressed the possibility that the effects of political violence and tensions vary 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 the decision to transition to the average parity level in the population. In the Azerbaijani context—characterized by almost universal motherhood and by limitation at high orders—that is the second birth.

The main findings of this research support this hypothesis. While the probability of transitioning to the first and third birth did not differ between those affected and those not exposed 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 42 percent higher chances of having a second child than nonexposed ones. This probability was also larger in highly violent years for conflict-affected women, while for the Azerbaijani population as a whole, it began to decline in the early postindependence period. This result suggests that different behaviors have been in place: on the one side the nonaffected population responded to parlous 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 resonates with the “fertility promotion” hypothesis (Fargues 2000; Abbasi-Shavazi, McDonald, and Hosseini-Chavoshi 2009; Schindler and Brück 2011). In a context where one-child families are becoming slowly, but progressively, more prevalent,

several factors could explain this higher propensity of conflict-affected women to have children. The first relates to risk-insurance mechanisms. Enlarging household size could represent an intentional coping strategy for conflict-affected families, not only in the long-term, when grown up children can provide additional resources to the family nucleus through, for instance, paid work. If economic assistance and support is provided to conflict-affected groups by national and/or international authorities, there might also be short-term incentives to increase household size. The government of Azerbaijan has for long devoted an important share of its GDP to its displaced population and set up IDP-specific social transfers like exemptions from utility payments, monthly allocations for basic foodstuffs, and deduced income tax rate (World Bank 2010; Gureyeva-Aliyeva and Huseynov 2011).³⁴ Although there are no IDP/refugee-specific social transfers that can be directly linked to fertility and the amounts of birth grants and childcare benefits available to the Azerbaijani population as a whole are relatively small,³⁵ it is possible that some of these government support schemes exert some influence over IDP/refugees' propensity to have children, especially if they also struggle with poverty. Risk-insurance mechanisms might also well apply at the macrolevel: in a conflict where warring groups base territorial legitimacy on population size, as in the Nagorno-Karabakh case, the perceived need to keep a demographic balance with the opposing faction at the group-level could explain the observed higher risk for conflict-affected women, and particularly for Karabakh residents.

A second plausible mechanism stems from the finding that experiencing child loss during conflict years is strongly and positively associated with higher fertility, irrespective of parity level.³⁶ This is consistent with child replacement effects and echoes results from other countries experiencing economic- and violence-related crises (Verwimp and van Bavel 2005; Schindler and Brück 2011). I find that this occurs independent of the sex of previous births. By contrast, the sex of prior children in itself is only influential for the transition to the next birth among nonaffected women. In Azerbaijan, where levels of sex ratio at birth have been historically high (Meslé, Vallin, and Badurashvili 2005; Guilmoto 2009; Duthé et al. 2012; Yüksel-Kaptanoglu et al. 2014), this 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 (Das Gupta and Shuzhuo 1999; Abbasi-Shavazi, McDonald, and Hosseini-Chavoshi 2009; Mavisakalyan and Minasyan 2018).

A third and related element that emerges from the analyses is that people's experience of conflict violence matters for their fertility responses (Kraehnert et al. 2019). This is evident not only from the higher hazards of second and third births for women who had the traumatic experience of child death during conflict years; also the finding of higher first-order fertility in the nonmigrant group of Karabakh women only points towards

this idea of a differential response depending on one's experience—whether direct and immediate or indirect and more chronic—of conflict-related uncertainty and stressors. Further, this could signal disruptive effects of forced migration on the early childbearing outcomes of women who flee from Karabakh as well as their possible assimilation to the behavior of the nonaffected population as they resettled 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 (Kulu 2005; Daudin, Frank, and Rapoport 2019) 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.

The role of preconflict norms and preexisting characteristics of each population subgroups is also likely to affect the kind and extent of their fertility responses and should thus not be ignored. In the case of Azerbaijan, the prewar predominantly rural character of women then exposed to the conflict³⁷ could have played a role and partially explain the higher overall childbearing risk of this group. Equally, another relevant and linked aspect that could account for the observed differences concerns the degree to which family planning resources and reproductive health services were accessible and available before, during and after the hostilities to vulnerable, conflict-affected women, particularly in rural areas (Verwimp and van Bavel 2005). If basic, perhaps already limited, reproductive health services are disrupted or become difficult to obtain as a result of conflict, women may see their access to adequate family planning methods and related knowledge, including modern contraception and safe abortions, sharply curtailed in a situation of heightened threats (McGinn 2000; McGinn et al. 2011). This in turn can translate into higher fertility, at least in the short term when dislocation occurs, and humanitarian assistance is not yet fully in place. The fact that higher risk of a second birth for conflict-exposed women was observed particularly in the first two years of violence may be an indication of this lack of appropriate reproductive healthcare provision.

Besides feeding the theoretical debate on the mechanisms linking conflict and fertility, these findings concern policymakers: in a context where fertility has been oscillating around the replacement level, if households more affected by violence are also at a less advanced stage in the fertility transition, *ceteris paribus*, their size and number relative to the nonexposed is going to increase with time, and their needs are going to become increasingly pressing. This highlights the importance of ensuring safe access to and availability of reproductive health services, including family planning, for conflict-affected and displaced households in times of intense conflict, but also in the aftermath of sustained fighting. Careful logistical planning of health services, especially in remote conflict-affected areas and among

IDP/refugee communities, as well as attention to modern contraception and family planning counselling are required. In countries like Azerbaijan, where abortion is widespread and often used as primary method of fertility regulation, and where it is reportedly difficult for some women and most men to openly discuss fertility-related issues, such interventions could help convergence in fertility among conflict-affected and nonaffected groups, in particular if the higher levels in the former are driven by unintended births.

Overall, however, responsibilities should not be left to national decision makers only. Concerted efforts at the international level to work towards reaching a credible peace settlement to the conflict in and around Nagorno-Karabakh should be prioritized. This is important for the development of both Azerbaijan and Armenia. More generally in today's world, where—as in Nagorno-Karabakh, but also in settings as diverse as Transnistria, South Ossetia and Abkhazia, and Crimea, to limit ourselves to the post-Soviet sphere—there is a tendency to “freeze” conflicts instead of finding durable solutions, with the risk that persisting tensions will “thaw” violently.

Notes

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1 For mortality, see, for instance, Grein et al. (2003) for Angola; Tabeau and Bjak (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 (2015) for Nepal.

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

3 Bulgaria, Moldova, and Romania.

4 Russia, Belarus, and Ukraine.

5 Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan.

6 I attempted painstakingly to sort through the often conflicting, vague, and relatively limited accounts of this neglected conflict. The aim of this section is thus to reconstruct as objectively as possible the historical developments of the conflict with

available information from official sources and historical documents. In no way, it seeks to compare human rights violations or atrocities committed by both Armenian and Azerbaijani forces, nor it seeks to propose any particular stance in the dispute.

7 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 interstate conflict (Human Rights Watch 1992; Zurcher 2007).

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

9 Forced migration in the Nagorno-Karabakh conflict featured both IDPs and refugees. The nature of this conflict, with its contested borders, has inevitably generated disputed categories and conceptual definitions of the terms and between the two belligerent parties. Nonetheless, the international community and Azerbaijan, as a signatory to the 1951 United Nations Convention relating to the Status of Refugees and its 1967 Protocol, refer to Azerbaijanis displaced from Karabakh as IDPs, given that they have not

crossed an internationally recognized border. Ethnic Azerbaijanis forced to leave Armenia were recognized at their arrival in Azerbaijan as *prima facie* refugees (UNHCR 2003; 2009). This group was then granted naturalization following the adoption of a Law on Citizenship in 1998, which though kept them eligible to the same benefits provided by the State to IDPs.

10 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 2019; U.S. Department of State 2016). Skirmishes also took place in July 2020.

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

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

13 Note that I excluded from the map events ($n = 30$) that had no specific location of occurrence or only provided general geographical coordinates for Azerbaijan.

14 I would like here to thank one of the reviewer of this paper who rightly pointed out that some of refugees from Armenia came to Azerbaijan as a result of some planned village population exchange before the full-war erupted (Huseynova and Romyantsev 2010). There is though also evidence that refugee flows from Armenia to Azerbaijan (and vice versa) following violent push and threats occurred also during the key conflict years. In general, whether the relocation from Armenia occurred in a peaceful manner or as a result of direct violence, following my conceptualization of conflict exposure, it still represents an indirect consequence of political tensions that likely impacted the lives of those concerned, including their decision to have children. For this reason, refugees from Armenia are coded as exposed in all model specifications.

15 It was not possible to obtain a list of the sampled district with names matching

numerical codes due to confidentiality reasons.

16 For instance, the two other economic regions registering conflict events, Aran in Central Azerbaijan and Ganja-Qazakh (North West), have, respectively, an area size of about 21,430 and 12,480 km². Linking conflict events at the region level would inevitably and erroneously mask variation in conflict exposure within these large geographic units.

17 Note that Table 1 provides descriptive statistics for the sample used in statistical analyses, which is restricted to ever married women aged 16+ at the time of the survey and exposed to the risk of first birth in calendar years 1992–2006 to avoid time-ordering issues related to conceptions and the onset of the conflict. In trend analyses, the sample was limited to women aged 16–39 in 2006 since individuals below age 16 were not asked the IDP/refugee status question. (See the Methods section for more.)

18 Given that data are truncated on older women, rates are here calculated for births and exposure of women aged 16–39. 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 over time.

19 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 is 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 .

20 Note that models considering all calendar years (i.e., 1980–2005) were also estimated. Results did not change qualitatively

in terms of significance and size for the conflict variables of interest and are available upon request.

21 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, ‘frailty’ terms are typically assumed to be normally distributed (Steele 2008).

22 Examples of these can be the frequency and time of intercourse, women’s work status and educational level at each time point, normative barriers associated with childlessness, and 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).

23 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 one observation had to be dropped accordingly.

24 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 realization in a live birth. Nonetheless, results were largely similar and are available upon request.

25 According to the AZ-DHS, the average number of months spent breastfeeding for the first and second birth in Azerbaijan is 7.5.

26 Note that official registration data on age-specific fertility rates from TransMonEE (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.

27 The ODE database was developed by the Institut national d’études démographiques (INED) and its methodology permits to calculate annual TFR using available data on the total number of live births and the age structure of female population in a year. For more information on the ODE methodology, refer to ODE, Calot, and Sardon (2002).

28 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.

29 Note that here trends are shown as three-year moving averages to smooth annual fluctuations due to sample size, especially among the exposed group.

30 Extended tables for all the transitions and conflict groups are reported in Appendix A, Tables A1, A2, and A3. For the all women sample, each table reports estimates from a model including only the conflict exposure measure (Column *a*), only calendar year (Column *b*), both variables (i.e., the full model, Column *c*), and a model that includes the interaction between calendar year and the conflict exposure measure (Column *d*). Columns *e* and *f* report results for the full model for the subsamples of women nonexposed and exposed to conflict, respectively.

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

32 Models estimated using calendar years 1980–2005 show in fact that 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 likelihood of having a third birth was on the rise and way higher than that of the nonexposed in the early 1980s.

33 Note that models including an interaction term between calendar year and the “narrow” conflict exposure measure are not

shown in the interest of space. Results do not vary from models using the “broad” definition and are available upon request.

34 As of 2010, the government of Azerbaijan spent nearly 3 percent of its yearly GDP on assistance programs and social support for IDPs (World Bank 2010, 2015; Gureyeva-Aliyeva and Huseynov 2011).

35 For instance, a lump sum payment for the birth of a child is paid to all families (about €44.2 in 2008). Equally, benefits for children aged up to 1 year are paid to all low-income families (about €16.30 per month). IDP school children, however, receive free education supplies (Asian Development Bank 2012; European Commission 2011).

36 While I could not find any independent estimate of the number of children di-

rectly killed by the conflict, a detailed report by UNFPA (2015) shows that in the period 1990–1994 infant and child mortality showed an increase at the national level compared to the preceding years. The same report also attempted to draw a subnational picture of territorial variation in infant and child mortality. Admittedly though, a variety of issue of data quality, including incomplete birth and death registration, make those estimates not fully reliable.

37 According to the 1989 USSR Census (Demoscope 2016) the vast majority of ethnic Azerbaijani living in Armenia was concentrated in rural areas (77,721 individuals out of 84,860 lived in rural zones of Armenia). Equally, there is evidence that the Azerbaijani population living in Nagorno-Karabakh before the conflict (later displaced) had a higher rate of population growth, especially in rural areas of the region (Yamskov 1991; USSR Population Statistical Collect 1988).

References

- Abbasi-Shavazi, Mohammed J. 1997. “An assessment of the Own-Children Method of Estimating Fertility by Birthplace in Australia.” *Journal of the Australian Population Association* 14(2): 167–185.
- , Peter McDonald, and Meimanat Hosseini-Chavoshi. 2009. “Effects of Marital Fertility and Nuptiality on Fertility Transition in Iran, 1976–2006.” In *The Fertility Transition in Iran: Revolution and Reproduction*, 83–92. Dordrecht: Springer Netherlands.
- Agadjanian, Victor. 1999. “Post-Soviet Demographic Paradoxes: Ethnic Differences in Marriage and Fertility in Kazakhstan.” *Sociological Forum* 14(3): 425–446.
- Agadjanian, Victor, Premchand Dommaraju, and Jennifer E. Glick. 2008. “Reproduction in Upheaval: Ethnic-Specific Fertility Responses to Societal Turbulence in Kazakhstan.” *Population Studies* 62(2): 211–233.
- Agadjanian, Victor, Premchand Dommaraju, and Lesia Nedoluzhko. 2013. “Economic Fortunes, Ethnic Divides, and Marriage and Fertility in Central Asia: Kazakhstan and Kyrgyzstan Compared.” *Journal of Population Research* 30 (3): 197–211.
- Agadjanian, Victor, and Ekaterina Makarova. 2003. “From Soviet Modernisation to Post-Soviet Transformation: Understanding Marriage and Fertility Dynamics in Uzbekistan.” *Development and Change* 34 (3): 447–473.
- Agadjanian, Victor, and Ndola Prata. 2002. “War, Peace, and Fertility in Angola.” *Demography* 39 (2): 215–231.
- Alesina, Alberto, and Paola Giuliano. 2010. “The Power of the Family.” *Journal of Economic Growth* 15 (2): 93–125.
- Aliyev, Alovzat. 2006. “Migration to and From Azerbaijan.” In *Migration Perspectives in Eastern Europe and Central Asia in: Planning and Managing Labour Migration*, 26–27. Geneva: International Organisation for Migration (IOM).
- Allison, Paul D. 1982. “Discrete-Time Methods for the Analysis of Event Histories.” *Sociological Methodology* 13: 61–98.
- Alsaba, Khuloud, and Anuj Kapilashrami. 2016. “Understanding Women’s Experience of Violence and the Political Economy of Gender in Conflict: The Case of Syria.” *Reproductive Health Matters*, 24(47): 5–17.

- Anderson, Barbara A., and Brian Silver. 1989. "Demographic Sources of the Changing Ethnic Composition of the Soviet Union." *Population and Development Review* 15(4): 609–656.
- Armenia Ministry of Foreign Affairs. 2020. "Nagorno-Karabakh Issue." Ministry of Foreign Affairs of the Republic of Armenia. <https://www.mfa.am/en/nagorno-karabakh-issue>
- Asian Development Bank (ADB). 2012. "Republic of Azerbaijan: Updating and improving the Social Protection Index." Regional—Capacity Development Technical Assistance.
- Austin, Judy, Samantha Guy, Louise Lee-Jones, Therese McGinn, and Jennifer Schlecht. 2008. "Reproductive Health: A Right for Refugees and Internally Displaced Persons." *Reproductive Health Matters* 16 (31): 10–21.
- Baev, Pavel K. 2007. "Defining Civil War by Examining Post-Soviet Conflicts." *Terrorism and Political Violence* 19(2): 247–268.
- Balcells, Laia. 2011. "Continuation of Politics by Two Means: Direct and Indirect Violence in Civil War." *Journal of Conflict Resolution*, 55(3): 397–422.
- Becker, Gary S., and Gregg H. Lewis. 1973. "On the Interaction between the Quantity and Quality of Children." *Journal of Political Economy* 81(2, Part 2): 279–288.
- Billingsley, Sunnee. 2010. "The Post-Communist Fertility Puzzle." *Population Research and Policy Review* 29(2): 193–231.
- . 2011. "Second and Third Births in Armenia and Moldova: An Economic Perspective of Recent Behaviour and Current Preferences." *European Journal of Population* 27(2): 125–155.
- Billingsley, Sunnee, and Aija Duntava. 2017. "Putting the Pieces Together: 40 Years of Fertility Trends across 19 Post-Socialist Countries." *Post-Soviet Affairs* 33(5): 389–410.
- Broers, Laurence. 2016. "The Nagorny Karabakh Conflict Defaulting to War." *Russia and Eurasia Programme, Chatham House, Research Paper*.
- Brück, Tilman, Patricia Justino, Philip Verwimp, Alexandra Avdeenko, and Andrew Tedesco. 2016. "Measuring Violent Conflict in Micro-Level Surveys: Current Practices and Methodological Challenges." *World Bank Research Observer*.
- Brunborg, Helge, and Ewa Tabeau. 2005. "Demography of Conflict and Violence: An Emerging Field." *European Journal of Population* 21(2-3): 131–144.
- Buvinic, Mayra, Monica Das Gupta, Ursula Casabonne, and Philip Verwimp. 2013. "Violent Conflict and Gender Inequality: An Overview." Technical Report Policy Research Working Paper No. 6371 Washington, DC: World Bank.
- Carta, Gaspare, Angela D'Alfonso, I. Colagrande, Paola Catana, Massimo Casacchia, and Felice Patacchiola. 2012. "Post-Earthquake Birth-Rate Evaluation Using the Brief Cope." *The Journal of Maternal-Fetal and Neonatal Medicine* 25(11): 2411–2414.
- Castro Torres, Andrés F., and Piedad B. Urdinola. 2019. "Armed Conflict and Fertility in Colombia 2000–2010." *Population Research and Policy Review* 38(2): 173–213.
- Cetorelli, Valeria. 2014. "The Effect on Fertility of the 2003–2011 War in Iraq." *Population and Development Review* 40(4): 581–604.
- Clark, William A. 1993. "Crime and Punishment in Soviet Officialdom, 1965–1990." *Europe-Asia Studies* 45(2): 259–279.
- Clifford, David, Jane Falkingham, and Andrew Hinde. 2010. "Through Civil War, Food Crisis and Drought: Trends in Fertility and Nuptiality in Post-Soviet Tajikistan." *European Journal of Population* 26: 325–350.
- Cohan, Catherine L., and Steve W. Cole. 2002. "Life Course Transitions and Natural Disaster: Marriage, Birth, and Divorce Following Hurricane Hugo." *Journal of Family Psychology* 16(1): 14–25.
- Commission on Security and Cooperation in Europe and Washington (CSCE). 2012. "First additional meeting of the council Helsinki, 23 March 1992." <https://www.osce.org/files/fi/documents/3/9/29121.pdf>
- . 2017. "Averting All-Out War in Nagorno-Karabakh: The Role of the U.S. and OSCE." <https://www.csce.gov/sites/helsinkicommission.house.gov/files/Nagorno-Karabakh%20Official.pdf>

- Cornell, Svante E. 2001. "The Armenian-Azerbaijani Conflict over Nagorno-Karabakh." In *Small Nations and Great Powers: A Study of Ethnopolitical Conflict in the Caucasus*, 357–392, 39. Richmond, UK: Curzon.
- . 2015. *Azerbaijan since Independence*. New York: Routledge.
- . 2017. *The International Politics of the Armenian-Azerbaijani Conflict: The Original "Frozen Conflict" and European Security*. New York: Palgrave Macmillan.
- Curiel, Rafael P., and Steven R. Bishop. 2018. "Fear of Crime: The Impact of Different Distributions of Victimisation." *Palgrave Communications* 4(1): 1–8.
- D'Aoust, Olivia, and Debarati Guha-Sapir. 2010. "Demographic and Health Consequences of Civil Conflict." *World Development Report 2011*: 47.
- Das Gupta, Monica, and Li Shuzhuo. 1999. "Gender Bias in China, South Korea and India 1920–1990: Effects of War, Famine and Fertility Decline." *Development and Change* 30(3): 619–652.
- Daudin, Guillaume, Raphael Frank, and Hillel Rapoport. 2019. "Can Internal Migration Foster the Convergence in Regional Fertility Rates? Evidence from 19th Century France." *The Economic Journal* 129(620): 1618–1692.
- de Waal, Thomas. 2004. "Black Garden: Armenia and Azerbaijan through Peace and War." *Refugee Survey Quarterly* 23(1): 237–238.
- de Walque, Damien. 2006. "The Socio-Demographic Legacy of the Khmer Rouge Period in Cambodia." *Population Studies* 60(2): 223–231.
- Demoscope Weekly. 2016. "All-Union Census in 1989. National Composition of the Population of the Republics of the USSR." Moscow: Institute of Demography of the National Research University Higher School of Economics.
- Duthé, Géraldine, France Meslé, Jacques Vallin, Irina Badurashvili, and Karine Kuyumjian. 2012. "High Sex Ratios at Birth in the Caucasus: Modern Technology to Satisfy Old Desires." *Population and Development Review* 38: 487–501.
- European Commission. 2011. *Social Protection and Social Inclusion in Azerbaijan*. Baku: Caucasus Research Resource Center.
- European Demographic Observatory (ODE), Gerard Calot, and Jean-Paul Sardon. 2002. "Methodology for the Calculation of Eurostat's Demographic Indicators." Technical Report, Luxembourg: European Demographic Observatory (ODE).
- Fargues, Philippe. 2000. "Protracted National Conflict and Fertility Change: Palestinians and Israelis in the Twentieth Century." *Population and Development Review* 26(3): 441–482.
- Ghobarah, Hazem A., Paul Huth, and Bruce Russett. 2003. "Civil Wars Kill and Maim the Shooting Wars Kill Civil People—Long after Stops." *The American Political Science Review* 97(2): 189–202.
- Gjonca, Arjan, Arnstein Aassve, and Letizia Mencharini. 2008. "Albania: Trends and Patterns, Proximate Determinants and Policies of Fertility Change." *Demographic Research* 19: 261–292.
- Goltz, Thomas. 2015. *Azerbaijan Diary: A Rogue Reporter's Adventures in an Oil-Rich, War-torn, Post-Soviet Republic*. London: Routledge.
- Grant, Thomas D. 2017. "Frozen Conflicts and International Law." *Cornell International Law Journal* 50 (3): 380–382.
- Greenway, John. 2009. "Europe's Forgotten People: Protecting the Human Rights of Long-Term Displaced Persons Committee on Migration, Refugees and Population." Technical Report. Strasbourg: Report to the Parliamentary Assembly of the Council of Europe.
- Grein, Thomas, Francesco Checchi, Josep M. Escribè, Abiy Tamrat, Unni Karunakara, Christopher Stokes, Vincent Brown, and Dominique Legros. 2003. "Mortality among Displaced Former UNITA Members and Their Families in Angola: A Retrospective Cluster Survey." *British Medical Journal (Clinical research ed.)* 327(7416): 650.
- Guilmoto, Christophe Z. 2009. The Sex Ratio Transition in Asia. *Population and Development Review* 35(3): 519–549.
- Gureyeva-Aliyeva, Yulia, and Huseynov, Tabib. 2011. "Can You be an IDP for Twenty Years?": A Comparative Field Study on the Protection Needs and Attitudes Towards Displacement Among IDPs and Host Communities in Azerbaijan." London: Brookings Institution-London School of Economics Project on Internal Displacement.

- Hill, Ken. 2004. *War, Humanitarian Crises, Population Displacement, and Fertility*. Washington, DC: National Academies Press.
- Hinde, Andrew. 1998. *Demographic Methods*. London: Routledge.
- Hobcraft, John. 1996. "Fertility in England and Wales: A Fifty-Year Perspective." *Population Studies* 50(3): 485–524.
- Hopmann, Terrence, and William I. Zartman. 2010. "Overcoming the Nagorno-Karabakh Stalemate." *International Negotiation* 15(1): 1–6.
- Human Rights Watch. 1992. *Bloodshed in the Caucasus: Escalation of the Armed Conflict in Nagorno-Karabakh* (Vol. 1245). New York: Human Rights Watch.
- . 1994. *Azerbaijan: Seven Years of Conflict in Nagorno-Karabakh*. New York: Human Rights Watch.
- Huseynov, Tabib. 2010. "Mountainous Karabakh: New Paradigms for Peace and Development in the 21st Century." *International Negotiation* 15(1): 7–31. 7.
- Huseynova, Sevil, and Sergey Rummyantsev. 2010. "New Life in Old Boots. Making One's Home in a New Village after Collective Resettlement." *Laboratorium: Russian Review of Social Research* 2(1): 28–49.
- International Crisis Group (ICG). 2019. "Digging out of Deadlock in Nagorno-Karabakh." Crisis Group Europe Report N°255, December 20, 2019.
- International Crisis Group. 2005. Nagorno-Karabakh: Viewing the Conflict from the Ground. Europe Report N°166, September 14, 2005.
- Iqbal, Zaryab. 2010. *War and the Health of Nations*. Stanford: Stanford University Press.
- Jayaraman, Anuja, Tesfayi Gebreleslassie, and Sethumadhavan Chandrasekhar. 2009. "Effect of Conflict on Age at Marriage and Age at First Birth in Rwanda." *Population Research and Policy Review* 28(5): 551–567.
- Jenkins, Stephen P. 1995. "Easy Estimation Methods for Discrete-Time Duration Models." *Oxford Bulletin of Economics and Statistics* 57 (1): 129–136.
- Jones, Ellen, and Fred W. Grupp. 1987. *Modernisation, Value Change, and Fertility in the Soviet Union*. Cambridge, UK: Cambridge University Press.
- Justino, Patricia. 2011. The Impact of Armed Civil Conflict on Household Welfare and Policy. *IDS Working Papers* 2011(384): 1–38.
- Kalyvas, Stathis N. 2006. *The Logic of Violence in Civil War*. Cambridge, UK: Cambridge University Press.
- Khawaja, Marwan, and Sara Randall. 2006. "Intifada, Palestinian Fertility and Women's Education." *Genus* 62 (1): 21–51.
- Kohler, Hans-Peter, and Iliana Kohler. 2002. "Fertility Decline in Russia in the Early and mid1990s: The Role of Economic Uncertainty and Labour Market Crises." *European Journal of Population* 18(3): 233–262.
- Kotowska, Irena, Janina Jozwiak, Anna Matysiak, and Anna Baranowska-Rataj. 2008. "Poland: Fertility Decline as a Response to Profound Societal and Labour Market Changes?." *Demographic Research* 19(22): 795–854.
- Kraehnert, Kati, Tilman Brück, Michele Di Maio, and Roberto Nisticò. 2019. "The Effects of Conflict on Fertility: Evidence from the Genocide in Rwanda." *Demography*, 56, 935–968.
- Kulu, Hill. 2005. "Migration and Fertility: Competing Hypotheses Re-Examined." *European Journal of Population* 21(1): 51–87.
- Ladier-Fouladi, Marie, and Bernard Hourcade. 1997. "The Paradoxes of Demographic Trends in Iran: Fertility in Rapid Decline." In *La Population du Monde: Enjeux et Problemes*, 209–224. Paris, France: Institut National d'Etudes Demographiques [INED].
- Larsen, Ursula, and James W. Vaupel. 1993. "Hutterite Fecundability by Age and Parity: Strategies for Frailty Modelling of Event Histories." *Demography* 30(1): 81–102.
- Lerch, Mathias. 2018. "Fertility and Union Formation During Crisis and Societal Consolidation in the Western Balkans." *Population Studies* 72(2): 217–234.
- Lieven, Anatol. 1992. *Corpses Litter Hills in Karabakh*. London: The Times.
- Lindskog, Evelina. E. 2016. "The Effect of War on Infant Mortality in the Democratic Republic of Congo." *BMC Public Health*, 16(1): 1059.

- Lindstrom, David P., and Betemariam Berhanu. 1999. "The Impact of War, Famine, and Economic Decline on Marital Fertility in Ethiopia." *Demography* 36(2): 247–61.
- Macura, Miroslav, and Alphonse MacDonald. 2003. "Fertility and Fertility Regulation in Eastern Europe: From the Socialist to the Post-Socialist Era." In *Population of Central and Eastern Europe. Challenges and Opportunities*, 35–90. Warsaw: Statistical Publishing Establishment.
- Mavisakalyan, Astighik, and Anna Minasyan. 2018. "The Role of Conflict in Sex Discrimination: The Case of Missing Girls." GLO Discussion Paper, No. 217. Maastricht: Global Labour Organisation.
- McGinn, Therese. 2000. "Reproductive Health of War-Affected Populations: What Do We Know?." *International Family Planning Perspectives* 26(4): 174–180.
- McGinn, Therese, Judy Austin, Katherine Anfinson, Ribka Amsalu, Sara E. Casey, Shihab I. Fadulalmula, Janet Meyers, Fredrick Kintu Mubiru, Melissa Sharer, Mary Yatter, and Jennifer Schlecht. 2011. "Family Planning in Conflict: Results of Cross-Sectional Baseline Surveys in Three African Countries." *Conflict and Health* 5(1): 11.
- McKay, Susan. 1998. "The Effects of Armed Conflict on Girls and Women." *Peace and Conflict* 4 (4): 381–392.
- Meslé, France, Jacque Vallin, and Irina Badurashvili. 2005. "A Sharp Increase in Sex Ratio at Birth in the Caucasus. Why? How?" In *Watering the Neighbour's Garden: The Growing Demographic Female Deficit in Asia*, 5–7. Paris: CICRED.
- MPIDR and VID 2018. "Human Fertility Collection (HFC)." Rostock and Vienna: Max Planck Institute for Demographic Research and Vienna Institute of Demography.
- Neal, Sara, Nicole Stone, and Roger Ingham. 2016. "The Impact of Armed Conflict on Adolescent Transitions: A Systematic Review of Quantitative Research on Age of Sexual Debut, First Marriage and First Birth in Young Women under the Age of 20 Years." *BMC Public Health* 16(1): 225.
- Nepal, Apsara, Martin Halla, and Steven Stillman. 2018. "Violent Conflict and the Child Quantity–Quality Trade-Off." IZA Discussion Paper No. 11690.
- Ni Bhrolcháin, Marie. 1987. "Period Parity Progression Ratios and Birth Intervals in England and Wales, 1941–1971: A Synthetic Life Table Analysis." *Population Studies* 41(1): 103–125.
- Nour, Nawal M. 2006. "Health Consequences of Child Marriage in Africa." *Emerging Infectious Diseases* 12(11): 1644–1649.
- Organisation for Security and Co-operation in Europe (OSCE). 2008. *Statement of the Co-Chairs of the OSCE Minsk Group — OSCE*. Press release.
- Østby, Gudrun. 2016. "Violence Begets Violence: Armed Conflict and Domestic Sexual Violence in Sub-Saharan Africa." In *SVAC (Sexual Violence and Armed Conflict) Workshop*. Cambridge MA: Harvard University.
- Palloni, Alberto, Kenneth Hill, and Guido P. Aguirre. 1996. "Economic Swings and Demographic Changes in the History of Latin America." *Population Studies* 50(1): 105–132.
- Parliamentary Assembly of the Council of Europe (PACE). 2015. "Progress of the Assembly's Monitoring Procedure" (October 2014– August 2015), Resolution. 2078 para. 9.
- Patel, Preeti, Maysoon Dahab, Mihoko Tanabe, Adrianna Murphy, Lydia Ettema, S Guy, and Bayard Roberts. 2016. "Tracking Official Development Assistance for Reproductive Health in Conflict-Affected Countries: 2002–2011." *BJOG: International Journal of Obstetrics and Gynaecology* 123(10): 1693–1704.
- Perelli-Harris, Brienna. 2005. "The Path to Lowest-Low Fertility in Ukraine." *Population Studies* 59(1): 55–70.
- Phillips, David E., Tim Adair, and Alan D. Lopez. 2018. "How Useful are Registered Birth Statistics for Health and Social Policy? A Global Systematic Assessment of the Availability and Quality of Birth Registration Data." *Population Health Metrics* 16(1), 21.
- Pichler, Floria. 2006. "Subjective Quality of Life of Young Europeans. Feeling Happy but Who Knows Why?" *Social Indicators Research* 75(3): 419–444.
- Plümper, Thomas, and Eric Neumayer. 2006. "The Unequal Burden of War: The Effect of Armed Conflict on the Gender Gap in Life Expectancy." *International Organisation* 60(3): 723–754.

- Pope, Hugh. 1992. "600 Azerbaijanis Slain at Khojaly, Investigator Says." *Los Angeles Times*, June 12, 1992. <https://www.latimes.com/archives/la-xpm-1992-06-12-mn-226-story.html>.
- Pullum, Thomas W. 2006. "An Assessment of Age and Date Reporting in the DHS Surveys, 1985–2003." DHS Methodological Reports No. 5 4.
- Rabusic, Ladislav. 2001. "Value Change and Demographic Behaviour in the Czech Republic." *Czech Sociological Review* 9(1): 99–122.
- Randall, Sara. 2005. "The Demographic Consequences of Conflict, Exile and Repatriation: A Case Study of Malian Tuareg." *European Journal of Population* 21(2-3): 291–320.
- Rindfuss, Ronald R., and James A. Sweet. 2006. "Postwar Fertility Trends and Differentials in the United States." *Population and Development Review* 3(4): 513.
- Roberts, Les, Riyadh Lafta, Richard Garfield, Jamal Khudhairi, and Gilbert Burnham. 2004. "Mortality before and after the 2003 Invasion of Iraq: Cluster Sample Survey." *The Lancet* 364(9448): 1857–1864.
- Saxena, Prem C., Andrzej Kulczycki, and Rozzet Jurdi. 2004. "Nuptiality Transition and Marriage Squeeze in Lebanon: Consequences of Sixteen Years of Civil War." *Journal of Comparative Family Studies* 35(2): 241–258.
- Schindler, Kati, and Tilman Brück. 2011. "The Effects of Conflict on Fertility in Rwanda." Washington, DC: The World Bank.
- Schoumaker, Bruno. 2013. "A STATA Module for Computing Fertility Rates and TFRs from Birth Histories: Tfr2." *Demographic Research* 28: 1093–1144.
- Shakhotska, Liudmila P. 2011. "Demographic Development of the Republic Belarus." In *New Demographic Faces of Europe*, 29–51. Berlin: Springer Berlin Heidelberg.
- Shemyakina, Olga. 2011. "The Effect of Armed Conflict on Accumulation of Schooling: Results from Tajikistan." *Journal of Development Economics* 95(2): 186–200.
- . 2013. "Patterns in Female Age at First Marriage and Tajik Armed Conflict." *European Journal of Population* 29(3): 303–343.
- Sillanpää, Anna. 2002. "The Effects of Wars on Population." In *War or Health?*, 198–207. Cape Town: NAE.
- Singh, Kavita, Unni Karunakara, Gilbert Burnham, and Kenneth Hill. 2005. "Forced Migration and Under-Five Mortality: A Comparison of Refugees and Hosts in North-Western Uganda and Southern Sudan." *European Journal of Population* 21(2-3): 247–270.
- Singh, Rupinder, and Juhani Laurila. 2011. "Azerbaijan: Recent Economic Developments and Policy Issues in Sustainability of Growth." Technical Report No. 5. Helsinki: Bank of Finland Institute for Economies in Transition.
- Sobotka, Thomas. 2004. "Is Lowest-Low Fertility in Europe Explained by the Postponement of Childbearing?." *Population and Development Review* 30(2): 195–220.
- Sobotka, Thomas, Krystof Zeman, and Vladimira Kantorova. 2003. "Demographic Shifts in the Czech Republic after 1989: A Second Demographic Transition View." *European Journal of Population* 19(3): 249–277.
- Spéder, Zsolt. 2006. "Rudiments of Recent Fertility Decline in Hungary: Postponement, Educational Differences, and Outcomes of Changing Partnership Forms." *Demographic Research* 15: 253–288.
- Spiegel, Paul B., and Peter Salama. 2000. "War and Mortality in Kosovo 1998–99: An Epidemiological Testimony!." *The Lancet* 355(9222): 2204–2209.
- Spoorenberg, Thomas. 2009. "The Impact of the Political and Economic Transition on Fertility and Family Formation in Mongolia." *Asian Population Studies* 5(2): 127–151.
- . 2013. "Fertility change in Central Asia since 1980." *Asian Population Studies* 9(1): 50–77.
- . 2014. "Reverse survival method of fertility estimation: An evaluation." *Demographic Research* 31(9): 217–246.
- . 2015. "Reconstructing historical fertility change in Mongolia: Impressive fertility rise before continued fertility decline." *Demographic Research* 33(1): 841–870.
- State Statistical Committee (SSC) Azerbaijan and Macro International Inc. 2008. *Azerbaijan Demographic and Health Survey*. Calverton: Macro International.

- Staveteig, Sarah E. 2011. *Genocide, nuptiality, and fertility in Rwanda and Bosnia-Herzegovina*. Doctoral thesis, sociology and demography. Berkeley: University of California.
- Steele, Fiona. 2008. "Multilevel Models for Longitudinal Data." *Journal of the Royal Statistical Society, Series A: Statistics in Society* 171 (1): 5–19.
- Stein, Petra, Sebastian Willen, and Monika Pavetic., 2014. "Couples' Fertility Decision-Making." *Demographic Research* 30(1): 1697–1732.
- Tabeau, Ewa, and Jakub Bijak. 2005. "War-Related Deaths in the 1992–1995 Armed Conflicts in Bosnia and Herzegovina: A Critique of Previous Estimates and Recent Results." *European Journal of Population* 21(2-3): 187–215.
- The National Statistical Service of Nagorno-Karabakh Republic. 2006. The Results of 2005 Census of the Nagorno-Karabakh Republic (Figures of the Nagorno-Karabakh Republic).
- The World Factbook 2017. *Central Intelligence Agency*. Washington DC: CIA.
- TransMonEE 2018. "TransMonEE: Transformative Monitoring for Enhanced Equity." <http://transmonee.org/>
- UCDP-GED 2019. "UCDP Conflict Encyclopaedia, Uppsala Conflict Data Program." <https://ucdp.uu.se/country/373>
- United Nations Children's Fund (UNICEF). 2005. "Early Marriage: A Harmful Traditional Practice." Technical Report, New York: UNICEF.
- United Nations General Assembly 2008. "Resolution adopted by the general assembly 62/243. 86th plenary meeting." New York: UNGA.
- United Nations High Commissioner for Refugees (UNHCR). 2003. "International Protection Considerations Regarding Azerbaijani Asylum-Seekers and Refugees." Technical Report. <https://www.refworld.org/docid/3f5f49fa4.html>. Geneva: UNHCR.
- . 2009. "Azerbaijan: Analysis of Gaps in the Protection of Internally Displaced Persons (IDPs)." Technical Report. <https://www.refworld.org/docid/53e1fad4.html>. Geneva: UNHCR.
- . 2013. "Being an IDP in Azerbaijan", report from a participatory assessment with IDPs in Azerbaijan." Technical Report. Baku: UNHCR.
- . 2017. "Global Trends in Forced Displacement in 2016." Technical Report. Geneva: UNHCR.
- United Nations Population Fund (UNFPA). (2015) *POPULATION SITUATION ANALYSIS: Beyond the Demographic Transition in Azerbaijan*. Baku: United Nations Population Fund.
- United Nations Security Council, Security Council resolution 822. 1993 [Armenia-Azerbaijan], 30 April 1993, S/RES/822 1993a).
- United Nations Security Council, Security Council resolution 853. 1993 [Armenia-Azerbaijan], 29 July 1993, S/RES/853 1993b).
- United Nations Security Council, Security Council resolution 874. 1993 [Armenia-Azerbaijan], 14 October 1993, S/RES/874 1993c).
- United Nations Security Council, Security Council resolution 884. 1993 [Armenia-Azerbaijan], 12 November 1993, S/RES/884 1993d).
- Urdal, Henrik. 2006. "A Clash of Generations? Youth Bulges and Political Violence." *International Studies Quarterly* 50(3): 607–629.
- Urdal, Henrik, and Chi P. Che. 2013. "War and Gender Inequalities in Health: The Impact of Armed Conflict on Fertility and Maternal Mortality." *International Interactions*, 39(4): 489–510.
- U.S. Department of State 1993. "Fighting Around Nagorno-Karabakh." Washington, DC: U.S. Department of State.
- . 2016. "Background Briefing on the Nagorno-Karabakh Conflict." Washington, DC: U.S. Department of State.
- USSR Population. Statistical Collection [Statisticheskii sbornik] 1988. Naselenie SSR. Moscow: 8–15, 27, 106
- Van Herp, Michel, Veronique Parqué, Edward Rackley, and Nathan Ford. 2003. "Mortality, Violence and Lack of Access to Healthcare in the Democratic Republic of Congo." *Disasters* 27(2): 141–53.
- Verwimp, Philip, and Jan van Bavel. 2005. "Child Survival and Fertility of Refugees in Rwanda." *European Journal of Population* 21(2-3): 271–80.

- Williams, Jill, Latifaf Ibisomi, Benn Sartorius, Kathleen Kahn, Mark Collinson, Stephen Tollman, and Michel Garenne. 2013. "Convergence in Fertility of South Africans and Mozambicans in Rural South Africa 1993–2009." *Global Health Action* 6(1): 19236.
- Williams, Nathalie E. 2015. "Mixed and Complex Mixed Migration During Armed Conflict: Multi-dimensional Empirical Evidence from Nepal." *International Journal of Sociology* 45(1): 44–63.
- Woldemicael, Gebremariam. 2008. "Recent Fertility Decline in Eritrea: Is it a Conflict-Led Transition?." *Demographic Research* 18: 27–58.
- World Bank. 2005. "Realising Azerbaijan's Comparative Advantages in Agriculture." Technical Report. Washington, DC: World Bank Group.
- . 2010. "Azerbaijan Living Conditions Assessment Report." Technical Report. Washington, DC: World Bank Group.
- . 2014. "Economic Development in Azerbaijan." Technical Report. Washington, DC: World Bank Group.
- . 2015. "Azerbaijan - Systematic country diagnostic." Technical Report. Washington, DC: World Bank Group.
- . 2017. "Fragility, Conflict, and Violence Annual Report." Technical Report. Washington, DC: World Bank Group.
- . 2018. "Azerbaijan - Internally Displaced Persons Economic Development Project." Technical Report. Washington, DC: World Bank Group.
- Yamakov, Anatoly N. 1991. "Ethnic Conflict in the Transcaucasus: The Case of Nagorno-Karabakh." *Theory and Society*, 20, 631–660.
- Yucesahin, Murat M., and Murat E. Ozgur. 2008. "Regional Fertility Differences in Turkey: Persistent High Fertility in the SOUTHEAST." *Population, Space and Place* 14 (2): 135–158.
- Yüksel-Kaptanoglu, Ilknur, Mehmet A. Eryurt, Ismet Koc, and Alanur Cavlin. 2014. "Mechanisms behind the Skewed Sex Ratio at Birth in Azerbaijan: Qualitative and Quantitative Analyses." Baku: UNFPA.
- Yunusov, Arif. 2002. "Statistics of Losses in the Armenian-Azerbaijani War." In *Karabakh Yesterday, Today and Tomorrow*, 20–22. Baku: Organization for Karabakh Liberation (In Russian).
- Zurcher, Christoph. 2007. *The Post-Soviet Wars: Rebellion, Ethnic Conflict and Nationhood in the Caucasus*. New York: New York University Press.

Appendix A

TABLE A1 Odds ratios of first birth after marriage, ever married women

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
Conflict exposure (ref: no)						
Yes	1.109		1.145	0.500		
Time since first birth (ref: <2 years)						
3-6	0.269***	0.254***	0.254***	0.257***	0.255***	0.329**
7-10	0.048***	0.042***	0.042***	0.042***	0.042***	0.067**
11+	0.032***	0.028***	0.028***	0.028***	0.041***	0.002***
Calendar year (ref: 1992)						
1993		1.688*	1.683*	1.538	1.626*	2.692
1994		1.894**	1.890**	1.783*	1.904**	2.370
1995		1.678	1.673	1.482	1.569	3.954
1996		1.430	1.423	1.496	1.574	1.054
1997		2.214**	2.199**	2.030*	2.195*	3.048
1998		2.816***	2.800***	2.633**	2.848**	3.872*

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TABLE A1 (continued)

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
1999		1.479	1.468	1.468	1.552	1.922
2000		1.205	1.197	1.144	1.192	1.569
2001		1.246	1.238	1.069	1.110	2.591
2002		1.773*	1.765*	1.595	1.698	2.830
2003		1.721	1.712	1.435	1.528	4.648
2004		1.108	1.102	1.077	1.148	1.093
2005		0.170***	0.170***	0.138***	0.133***	0.568
Calendar year (ref: 1992) * Exposure						
1993 * Yes				2.471		
1994 * Yes				2.011		
1995 * Yes				3.632		
1996 * Yes				0.900		
1997 * Yes				2.464		
1998 * Yes				2.218		
1999 * Yes				1.418		
2000 * Yes				1.894		
2001 * Yes				3.783		
2002 * Yes				2.927		
2003 * Yes				5.440		
2004 * Yes				1.505		
2005 * Yes				4.679*		
Education (ref: secondary or less)						
Secondary-special	1.186	1.171	1.167	1.183	1.145	1.365
Higher	1.438	1.510	1.514	1.529	1.402	2.392
Residence type (ref: urban)						
Rural	1.118	1.168	1.173	1.173	1.255	0.857
Age at marriage	1.539***	1.576***	1.576***	1.578***	1.570***	1.998**
Age at marriage squared	0.989***	0.988***	0.988***	0.988***	0.988***	0.984***
σ_u^2	2.488	2.656	2.642	2.737	3.179	1.074
$N_{w,y}$	5349	5349	5349	5349	4650	699

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

NOTES: Column (a) presents results for the full-sample model with the conflict indicator and controls only; Column (b) presents results for the full-sample model with calendar year and controls only; Column (c) presents results for the full-sample model with all variables; Column (d) adds an interaction term between calendar year and the exposure variable; Columns (e) and (f) present results for models with all variables for samples of each conflict group separately. $N_{w,y}$: number of years of exposure in total analysis period for sampled women. SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

TABLE A2 Odds ratios of second birth, ever married women

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
Conflict exposure (ref: no)						
Yes	1.392***		1.417***	1.741*		
Time since first birth (ref: <2 years)						
3-6	0.546***	0.456***	0.463***	0.463***	0.438***	0.800
7-10	0.123***	0.102***	0.104***	0.104***	0.099***	0.222
11+	0.013***	0.013***	0.013***	0.013***	0.014***	0.010***
Calendar year (ref: 1992)						
1993		0.819	0.818	0.818	0.851	1.052*
1994		0.846	0.847	0.833	0.822	1.064*
1995		0.683*	0.682*	0.720*	0.705*	0.425
1996		0.658*	0.654*	0.690*	0.689*	0.422
1997		0.631*	0.623*	0.656*	0.660*	0.414
1998		0.681*	0.670*	0.698*	0.701*	0.521
1999		0.716*	0.705*	0.706	0.709	0.717
2000		0.442***	0.433***	0.462***	0.464***	0.274*
2001		0.571**	0.562**	0.574**	0.576**	0.431
2002		0.633*	0.619*	0.617*	0.620*	0.549
2003		0.620**	0.608**	0.602**	0.605**	0.608
2004		0.705	0.692	0.691	0.694	0.654
2005		0.109***	0.107***	0.099***	0.100***	0.134**
Calendar year (ref: 1992) * Exposure						
1993 * Yes				1.038*		
1994 * Yes				1.219*		
1995 * Yes				0.570		
1996 * Yes				0.592		
1997 * Yes				0.624		
1998 * Yes				0.700		
1999 * Yes				0.943		
2000 * Yes				0.603		
2001 * Yes				0.810		
2002 * Yes				0.947		
2003 * Yes				1.012		
2004 * Yes				0.957		
2005 * Yes				1.454		
Previous child died during conflict years (ref: no)						
Yes	3.328*	2.623*	2.378*	2.466*	0.435	6.715***
Sex of first child (ref: male)						
Female	1.108*	1.081*	1.081*	1.079*	1.104*	0.990
Education (ref: secondary or less)						
Secondary-special	0.901	0.893	0.887	0.886	0.858	1.148
Higher	0.698**	0.752*	0.755*	0.751*	0.780	0.545
Residence type (ref: urban)						
Rural	1.652***	1.586***	1.617***	1.615***	1.585***	1.820**

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TABLE A2 (continued)

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
Age at first birth	0.937***	0.940***	0.940***	0.940***	0.938***	0.943
σ_u^2	0.434	0.144	0.149	0.154	0.100	0.486
$N_{w,y}$	8630	8630	8630	8630	7545	1085

*p<0.05, **p<0.01, ***p<0.001.

NOTES: Column (a) presents results for the full-sample model with the conflict indicator and controls only; Column (b) presents results for the full-sample model with calendar year and controls only; Column (c) presents results for the full-sample model with all variables; Column (d) adds an interaction term between calendar year and the exposure variable; Columns (e) and (f) present results for models with all variables for samples of each conflict group separately. $N_{w,y}$: number of years of exposure in total analysis period for sampled women.

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

TABLE A3 Odds ratios of third birth, ever married women

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
Conflict exposure (ref: no)						
Yes	0.814		0.855	1.560		
Time since first birth (ref: <2 years)						
3-6	0.628***	0.593***	0.594***	0.592***	0.578***	0.747
7-10	0.203***	0.198***	0.198***	0.197***	0.171***	0.516
11+	0.042***	0.047***	0.047***	0.047***	0.045***	0.069***
Calendar year (ref: 1992)						
1993		1.043	1.041	1.105	1.105	0.699
1994		0.744	0.743	0.802	0.802	0.439
1995		0.738	0.738	0.793	0.795	0.452
1996		0.877	0.877	0.972	0.976	0.418*
1997		0.704	0.703	0.764	0.767	0.386
1998		0.764	0.764	0.820	0.826	0.461
1999		0.548**	0.548**	0.619	0.623	0.212*
2000		0.631*	0.633*	0.714	0.719	0.256*
2001		0.450***	0.452***	0.528**	0.534**	0.135**
2002		0.542**	0.544**	0.587*	0.595*	0.306*
2003		0.666	0.669	0.752	0.76	0.291*
2004		0.656*	0.661*	0.669	0.675	0.541
2005		0.302***	0.304***	0.299***	0.300***	0.311*
Calendar year (ref: 1992) * Exposure						
1993 * Yes				0.647		
1994 * Yes				0.543		
1995 * Yes				0.569		
1996 * Yes				0.416*		
1997 * Yes				0.512		
1998 * Yes				0.579		
1999 * Yes				0.330		
2000 * Yes				0.354		
2001 * Yes				0.251*		
2002 * Yes				0.545		

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TABLE A3 (continued)

	All women				Nonexposed	Exposed
	(a)	(b)	(c)	(d)	(e)	(f)
2003 * Yes				0.386		
2004 * Yes				0.806		
2005 * Yes				0.949		
Second child died during conflict years (ref: no)						
Yes	14.010***	8.351***	8.330***	8.318***	7.841***	20.032***
Sex of previous children (ref: at least one male)						
Only female	1.639***	1.624***	1.622***	1.636***	1.644***	1.331
Education (ref: secondary or less)						
Secondary-special	0.856	0.841	0.848	0.843	0.832	0.914
Higher	0.784	0.793	0.788	0.783	0.727	1.556
Residence type (ref: urban)						
Rural	2.087***	2.041***	2.028***	2.022***	2.056***	1.733*
Age at second birth	0.941***	0.942***	0.942***	0.942***	0.943***	0.934*
σ_u^2	0.353	0.042	0.014	0.004	0.031	0.006
$N_{w,y}$	19730	19730	19730	19730	17182	2548

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

NOTES: Column (a) presents results for the full-sample model with the conflict indicator and controls only; Column (b) presents results for the full-sample model with calendar year and controls only; Column (c) presents results for the full-sample model with all variables; Column (d) adds an interaction term between calendar year and the exposure variable; Columns (e) and (f) present results for models with all variables for samples of each conflict group separately. $N_{w,y}$: number of years of exposure in total analysis period for sampled women.

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

TABLE A4 Odds ratios of first birth by extended conflict status, ever married women

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)	(c)	(d)	(e)
Conflict exposure (ref: no)					
IDPs/refugees	1.093	0.400			
Karabakh residents	1.423*	1.928			
Time since first birth (ref: <2 years)					
3-6	0.254***	0.255***	0.255***	0.363*	0.198
7-10	0.042***	0.042***	0.042***	0.075*	0.046*
11+	0.028***	0.027***	0.041***	0.022*	0.001***
Calendar year (ref: 1992)					
1993	1.682*	1.544	1.626*	2.623	1.645
1994	1.891**	1.795*	1.904**	2.675	0.607
1995	1.672	1.490	1.569	4.707	0.605
1996	1.424	1.504	1.574	1.008	0.544
1997	2.200**	2.049*	2.195*	3.845	0.243
1998	2.795***	2.656**	2.848**	4.841*	0.461
1999	1.465	1.477	1.552	2.237	0.728
2000	1.196	1.150	1.192	1.515	0.665

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TABLE A4 (continued)

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)			
2001	1.238	1.075	1.110	2.269	2.100
2002	1.764*	1.609	1.698	2.624	1.162
2003	1.715	1.448	1.528	4.055	6.494
2004	1.103	1.085	1.148	0.767	3.371
2005	0.169***	0.137***	0.133***	0.563	0.103*
Calendar year (ref: 1992) * IDP/refugee					
1993 * Yes		2.779			
1994 * Yes		2.726			
1995 * Yes		5.219			
1996 * Yes		1.042			
1997 * Yes		4.413			
1998 * Yes		4.022			
1999 * Yes		1.573			
2000 * Yes		2.229			
2001 * Yes		4.213			
2002 * Yes		3.821			
2003 * Yes		6.019			
2004 * Yes		1.436			
2005 * Yes		5.670*			
Calendar year (ref: 1992) * Karabakh resident					
1993 * Yes		1.196			
1994 * Yes		0.344			
1995 * Yes		0.576			
1996 * Yes		0.378			
1997 * Yes		0.153*			
1998 * Yes		0.231			
1999 * Yes		0.489			
2000 * Yes		0.624			
2001 * Yes		1.572			
2002 * Yes		0.667			
2003 * Yes		2.608			
2004 * Yes		2.182			
2005 * Yes		1.401			
Education (ref: secondary or less)					
Secondary-special	1.163	1.181	1.145	1.772	0.349
Higher	1.504	1.516	1.402	5.133*	0.109*
Residence type (ref: urban)					
Rural	1.157	1.155	1.255	0.549	1.041
Age at marriage	1.578***	1.592***	1.570***	1.168	3.519*
Age at marriage squared	0.988***	0.988***	0.988***	0.994	0.973*
σ_u^2	2.648	2.774	3.179	0.477	3.353
$N_{w,y}$	5349	5349	4650	506	103

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. $N_{w,y}$: number of years of exposure in total analysis period for sampled women.

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

TABLE A5 Odds ratios of second birth by extended conflict status, ever married women

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)			
Conflict exposure (ref: no)					
IDPs/refugees	1.411**	1.570*			
Karabakh residents	1.447***	3.366*			
Time since first birth (ref: <2 years)					
3-6	0.463***	0.463***	0.438***	0.937	0.370
7-10	0.104***	0.103***	0.099***	0.285	1.001
11+	0.013***	0.013***	0.014***	0.007**	0.119
Calendar year (ref: 1992)					
1993	0.819	0.871	0.851	1.048*	1.067*
1994	0.847	0.833	0.822	1.112*	1.026*
1995	0.682*	0.721*	0.705*	0.367	0.563
1996	0.654*	0.690*	0.689*	0.441	0.185
1997	0.623*	0.657*	0.660*	0.411	0.272*
1998	0.670*	0.698*	0.701*	0.481	0.659
1999	0.705*	0.707	0.709	0.702	0.713
2000	0.433***	0.462***	0.464***	0.285	0.119**
2001	0.562**	0.574**	0.576**	0.463	0.155*
2002	0.619*	0.617*	0.620*	0.542	0.369
2003	0.608**	0.602**	0.605**	0.704	0.175*
2004	0.692	0.691	0.694	0.760	0.171**
2005	0.107***	0.099***	0.100***	0.124**	0.120**
Calendar year (ref: 1992) * IDP/refugee					
1993 * Yes		1.042*			
1994 * Yes		1.080*			
1995 * Yes		0.518			
1996 * Yes		0.654			
1997 * Yes		0.674			
1998 * Yes		0.693			
1999 * Yes		0.995			
2000 * Yes		0.685			
2001 * Yes		0.960			
2002 * Yes		1.017			
2003 * Yes		1.266			
2004 * Yes		1.244			
2005 * Yes		1.482			
Calendar year (ref: 1992) * Karabakh resident					
1993 * Yes		1.022*			
1994 * Yes		1.058*			
1995 * Yes		0.785			
1996 * Yes		0.308			

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TABLE A5 (continued)

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)	(c)	(d)	(e)
1997 * Yes		0.381			
1998 * Yes		0.713			
1999 * Yes		0.709			
2000 * Yes		0.268*			
2001 * Yes		0.278			
2002 * Yes		0.563			
2003 * Yes		0.288*			
2004 * Yes		0.251**			
2005 * Yes		1.067			
First child died during conflict years (ref: no)					
Yes	2.381*	2.485*	0.435	8.251***	0.683
Sex of first child (ref: ale)					
Female	1.081*	1.076*	1.104*	0.931	1.069
Education (ref: secondary or less)					
Secondary-special	0.887	0.887	0.858	1.142	1.483
Higher	0.755*	0.751*	0.780	0.532	0.470
Residence type (ref: urban)					
Rural	1.615***	1.613***	1.585***	2.123*	1.496
Age at first birth	0.940***	0.939***	0.938***	0.970	0.886*
σ_u^2	0.149		0.100	0.498	0.357
$N_{w,y}$	8630	8630	7545	753	332

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$N_{w,y}$: number of years of exposure in total analysis period for sampled women.

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

TABLE A6 Odds ratios of third birth by extended conflict status, ever married women

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)			
Conflict exposure (ref: no)					
IDPs/refugees	0.802	1.628			
Karabakh residents	1.071	1.335			
Time since first birth (ref: <2 years)					
3-6	0.594***	0.593***	0.578***	0.893	0.552
7-10	0.197***	0.197***	0.171***	0.671	0.230**
11+	0.047***	0.047***	0.045***	0.056**	0.120*
Calendar year (ref: 1992)					
1993	1.041	1.105	1.105	0.658	0.914
1994	0.744	0.802	0.802	0.330	1.040
1995	0.739	0.794	0.795	0.315	1.138
1996	0.878	0.972	0.976	0.338*	0.858
1997	0.704	0.764	0.767	0.345	0.547
1998	0.765	0.82	0.826	0.385	0.805
1999	0.549**	0.62	0.623	0.199*	0.294
2000	0.635*	0.714	0.719	0.256	0.283
2001	0.453***	0.528**	0.534**	0.116*	0.243
2002	0.545**	0.588*	0.595*	0.272	0.488
2003	0.67	0.752	0.76	0.196*	0.849
2004	0.663*	0.671	0.675	0.606	0.456
2005	0.306***	0.300***	0.300***	0.395	0.120
Calendar year (ref: 1992) * IDP/refugee					
1993 * Yes		0.618			
1994 * Yes		0.422			
1995 * Yes		0.430			
1996 * Yes		0.340			
1997 * Yes		0.482			
1998 * Yes		0.505			
1999 * Yes		0.304			
2000 * Yes		0.342			
2001 * Yes		0.207			
2002 * Yes		0.484			
2003 * Yes		0.247*			
2004 * Yes		0.824			
2005 * Yes		1.030			
Calendar year (ref: 1992) * Karabakh resident					
1993 * Yes		0.756			
1994 * Yes		1.163			
1995 * Yes		1.313			
1996 * Yes		0.795			

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TABLE A6 (continued)

	All women		Nonexposed	IDPs/refugees	Karabakh residents
	(a)	(b)			
1997 * Yes		0.635			
1998 * Yes		0.929			
1999 * Yes		0.453			
2000 * Yes		0.393			
2001 * Yes		0.470			
2002 * Yes		0.829			
2003 * Yes		1.116			
2004 * Yes		0.673			
2005 * Yes		0.396			
Second child died during conflict years (ref: no)					
Yes	8.310***	8.357***	7.841***	35.310***	10.396
Sex of previous children (ref: at least one male)					
Only female	1.622***	1.634***	1.644***	1.206	2.030
Education (ref: secondary or less)					
Secondary-special	0.848	0.842	0.832	0.992	0.575
Higher	0.788	0.779	0.727	1.506	1.977
Residence type (ref: urban)					
Rural	2.000***	1.992***	2.056***	1.274	1.420
Age at second birth	0.942***	0.941***	0.943***	0.918	0.955
σ_u^2	0.073	0.021	0.031	0.019	0.340
$N_{w,y}$	19730	19730	17182	2196	352

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$N_{w,y}$: number of years of exposure in total analysis period for sampled women.

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.

Appendix B

TABLE B1 Odds ratios of first, second, and third birth by conflict status (narrow definition)

	1st birth	2nd birth	3rd birth
Conflict exposure - narrow definition (ref: not exposed)			
Yes	1.185	1.421***	0.852
Time since first birth (ref: <2 years)			
3-6	0.254***	0.463***	0.594***
7-10	0.042***	0.104***	0.198***
11+	0.028***	0.013***	0.047***
Calendar year (ref: 1992)			
1993	1.683*	0.819	1.041
1994	1.892**	0.848	0.743
1995	1.674	0.683*	0.738
1996	1.426	0.655*	0.876
1997	2.203**	0.626*	0.703
1998	2.802***	0.673*	0.763
1999	1.467	0.709*	0.547**
2000	1.199	0.435***	0.632*
2001	1.239	0.563**	0.451***
2002	1.765*	0.621*	0.542**
2003	1.715	0.609**	0.668
2004	1.105	0.693	0.660*
2005	0.170***	0.107***	0.304***
First child died during conflict years (ref: no)			
Yes		2.570*	
Sex of first child (ref: male)			
Female		1.083*	
Second child died during conflict years (ref: no)			
Yes			8.298***
Sex of previous children (ref: at least one male)			
Only female			1.615***
Education (ref: secondary or less)			
Secondary-special	1.167	0.888	0.846
Higher	1.510	0.756*	0.786
Residence type (ref: urban)			
Rural	1.171	1.610***	2.030***
Age at marriage			
Age at marriage squared	0.988***		
Age at first birth			
Age at second birth		0.940***	0.942***

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TABLE B1 (continued)

	1st birth	2nd birth	3rd birth
σ_u^2	2.643	0.149	0.015
$N_{w,y}$	5349	8630	19730

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$N_{w,y}$: number of years of exposure in total analysis period for sampled women. Note that models including an interaction term between calendar year and the conflict exposure measure are not shown for space constraints (see note 32).

SOURCE: 2006 AZ-DHS. Exponentiated coefficients.