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Violent instability and modern contraception: Evidence from Mali

Orsola Torrisi[1][2]

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Abstract
This study examines the consequences of armed violence on sexual and reproductive health in Mali, a country where modern contraceptive use (MCU) is low and a violent insurrection has been ongoing since 2012. I combine data from the 2006 and 2018 Demographic and Health Surveys with information on conflict events location and exploit spatial and temporal variation in violence intensity to investigate changes in women's and men's MCU associated with the insurrection. Results indicate that conflict violence is associated with reductions in MCU, particularly short-acting methods. Further, the insurrection is linked to increases in current unwanted pregnancies and women's intention to use contraception. Analyses of potential mechanisms suggest that, for women, the slowdown in MCU can be partially attributed to diminished knowledge about where to obtain contraception. For men, the insurrection is simultaneously related to a downward shift in fertility preferences and an upward shift in sexual activity, perhaps also signalling some 'supply-side' unmet needs for male-controlled methods. Findings further suggest that where violence was most intense, the conflict undermined women's reproductive autonomy. Provision of modern contraception remains a priority in humanitarian settings. To be meaningful, interventions should consider both women's and men's needs and integrate a gender perspective into their design.

[1] New York University Abu Dhabi
[2] London School of Economics

Introduction

In the late 2000s, after nearly two decades of multiparty politics, Mali was considered a "democratic success story" in the otherwise volatile region of the Sahel-Sahara (Solomon, 2013, Wing, 2013). However, in January 2012, a rebel insurrection in its Northern territories turned the country into an epicentre of conflict and instability. While the origins of the conflict can be traced back to long-lasting grievances and separatist drives of the Tuareg minority, the 2012 violence outbreak occurred suddenly, after the return from Libya of heavily armed Malian Tuareg mercenaries who had fought in the army of Muammar Gaddafi until his fall (Chena & Tisseron, 2013). In just 12 months, Tuareg rebels supported by militant jihadist groups attacked government security posts, prompted an army mutiny and a *coup d'état* in the capital Bamako, and proclaimed the independence of Mali's Northern half. Despite the deployment of international special missions and the establishment of a United Nations (UN)-led peacekeeping operation, the conflict is still unsettled. Rather, Mali has witnessed a proliferation of jihadist groups, ethnic militias, and growing insecurity since (Thurston, 2020a).

The conflict had dramatic impacts on the Malian people. After years of steady improvement, under-5 mortality rates deteriorated markedly in the North (Masset, 2022). Health facilities were occupied, looted and destroyed (World Bank, 2016). Schooling was severely disrupted (UNESCO and Ministères de l'éducation, 2014) and agriculture productivity fell, causing price increases and growing food insecurity (Kimenyi et al., 2014). Daily mobility was restricted and vulnerability to gender-based violence increased, particularly for women (Ekhator-Mobayode et al., 2021; International Crisis Group, 2019; OSRSG-SVC, 2021). The insurrection caused a displacement crisis: in 2012, between 375-500,000 Malians were forced to leave their homes and seek security in other areas within Mali or neighbouring countries (UN OCHA, 2018, Etang-Ndip et al., 2015, Baudot, 2013, Lendorfer et al., 2016). Those who returned after the peak of the crisis found their assets and livestock decimated (Hoogeveen et al., 2019). To date, only a handful of humanitarian organisations have managed to continue their relief operations in conflict-affected zones due to a lack of donor funding, threat and insecurity (World Bank, 2016). Despite these reports, systematic assessments of the consequences of the 2012 insurrection on population health in Northern Mali and surrounding territories remain scarce, even when compared to similar instances of violence like the jihadist insurrections in North-Eastern Nigeria (Chukwuma and Ekhator-Mobayode, 2019, Dunn, 2018, Ekhator-Mobayode and Abebe Asfaw, 2019).

Sexual and reproductive health (SRH) – the need, right and access to safe and effective modern contraceptive methods of choice in particular – remains particularly neglected in Mali and humanitarian settings more broadly (McGinn, 2000, Singh et al., 2018, Tunçalp et al., 2015). It is well-established that good SRH and family planning bring several benefits to individuals and society, including reductions in maternal mortality, morbidity, unsafe abortion and sexually transmitted infections (STIs) (Bongaarts and

Westoff, 2000, Cleland et al., 2006), greater empowerment and human capital formation (Longwe and Smits, 2013, Prata et al., 2017, Stevenson et al., 2021), improved community health and poverty alleviation (Canning & Schultz, 2012). The provision and use of modern contraceptive methods are recognised components of sustainable global development (Osotimehin, 2015, Starrs et al., 2018, UN Economic and Social Council, 2015) and, in African countries in particular, they are deemed to be important determinants for fertility reduction (Casterline, 2017, Tsui et al., 2017). Despite these well-known benefits and the growing recognition of SRH as a critical health issue in humanitarian crises (Austin et al., 2008, UNFPA, 2020), SRH services are still rarely prioritised in conflict settings (Sachs et al., 2022, Starrs et al., 2018). Similarly, research efforts in this area continue to be modest, despite the World Health Organization (WHO)'s recent call for more robust evaluations of SRH needs and contraceptive service provision in fragile settings (Kobeissi et al., 2021).

To date, only two quantitative studies have comprehensively examined the consequences of armed conflict on modern contraceptive use (MCU), with mixed results. Williams et al. (2012) documented an increase in first MCU among women and men during the civil war in Nepal and attributed it to conflict-induced downward shifts in fertility preferences. In contrast, Svallfors and Billingsley (2019) found that local armed violence in Colombia reduced women's MCU, and only in small part because of higher fertility demand. In related studies, albeit on natural disasters, Behrman and Weitzman (2016) and Hapisari et al. (2009) also observed reductions in women's use of injections after, respectively, the 2010 Haitian earthquake and the 2004 Indian Ocean tsunami. The few other rigorous studies that touch upon the relationship between armed violence and MCU are post-conflict program evaluations (Casey et al., 2013, Casey and Tshipamba, 2017) or research articles that discuss contraception either tangentially as a pathway for changes in other primary outcomes (e.g., Rotondi and Rocca (2021) and Thiede et al. (2020) on conflict-related fertility changes) or in relation to issues of measurement (Le Voir, 2022). No study has specifically focused on the consequences of conflict on MCU in the Sahel-Sahara – a region where violence intersects with various other gender and SRH issues (Senderowicz et al., 2018, Shekar et al., 2016) – nor has any explicitly considered them for both women and men.

This study thus contributes to knowledge by providing a first systematic investigation of whether insurrectionist violence influenced MCU among individuals of reproductive ages in Mali, and offers suggestive evidence on plausible driving mechanisms. I combine data on MCU from Demographic and Health Surveys collected in Mali before and after conflict onset with geocoded information on conflict events and leverage spatial and temporal variation in conflict intensity in a difference-in-difference (DID) framework. Findings suggest that the insurrection, particularly where violence was intense, is associated with a slowdown in the adoption of modern contraception. For women, the conflict is also linked to greater likelihood of being currently pregnant, with an unwanted pregnancy and intending to use family planning in the future. Results are robust to a number of tests, including checks for selective migration, alternative definitions, couple-level analyses and data sources on violence, and do not appear to be driven by pre-existing trends.

I examine several mechanisms that may explain the observed results, including changes in fertility preferences, sexual activity, knowledge of where to obtain contraception, female sexual empowerment and attitudes towards contraception. Among these, I find that the insurrection is associated with a decline in women's knowledge of where to access contraceptives. While access knowledge is not directly testable for men, the fact that the conflict is concurrently linked to an upward shift in their sexual activity and a downward shift in fertility preferences may be an indication of access issues and 'supply-side' unmet need (Senderowicz & Maloney, 2022). Importantly, the results suggest that where violence was most intense, the insurrection undermined women's reproductive autonomy in two ways: (i) directly, by reducing their ability to ask partners to use condoms and refuse sex and (ii) indirectly, by fostering gender-inequal attitudes towards SRH and reactionary views of women who use contraception among men.

This study adds to the literature on the consequences of violent crises on population health and reproductive outcomes as the first to (i) provide on both women's and men's MCU, and (ii) in a context where violence is still ongoing, but research on SRH is minimal (Ataullahjan et al., 2020, Tunçalp et al., 2015). While impacts and pathways are gender-specific, studying women and men in tandem is important because contraceptive (non-)use results from dyadic interactions and power relations that often precede and are exacerbated by violence (Blanc, 2001, El Jack, 2003). At the same time, examining gender-specific contraceptive behaviour can also offer some cues to research on the health of vulnerable and marginalised groups, e.g., unpartnered youths and sexual minorities, in the context of armed conflict, where data is often minimal and discrimination persists (Casey et al., 2020, Kiss et al., 2020). Thus, analysing whether violence influences women's and men's MCU differently can broaden our understanding of the gendered outcomes of war, and in turn support the development of programs that can best cater to respective sexual behaviours and needs (Prata et al., 2005). Results are also salient for policy because the conflict in Mali continues to date, and similar violence is spreading elsewhere in the populous Sahel-Sahara region, with consequences that are potentially unprecedented in their magnitude.

Armed conflict and modern contraceptive use: perspectives and pathways

Theoretical and empirical knowledge on MCU in theatres of war is scant (McGinn, 2000, McGinn et al., 2004) and the one available mostly derives from research not concerned with MCU *per se*, but more broadly with fertility changes in wartime (in this sense, work by Svallfors (2022) in Colombia is an important exception). This literature often discusses MCU as a mechanism for fertility shifts (e.g., Kraehnert et al., 2019, Rotondi and Rocca, 2021, Thiede et al., 2020), but it rarely tests the channel directly. In addition, as the empirical record on conflict and fertility is ambiguous with regards to both the direction and existence of a relationship, so are expectations about MCU.

As Svallfors and Billingsley (2019) suggest, a "Ready-Willing-Able" framework represents a useful point of departure to bring clarity and map out factors and pathways that may influence MCU in violent settings. Originally proposed by Coale (1973) to interpret fertility reduction through contraception in Europe, the model identifies three necessary factors for family planning to occur: *readiness*, *willingness* and *ability*. The *readiness* factor reflects economic utility: if contraceptive use appears advantageous to individuals' and couples' cost-benefit calculations, this will work as an incentive for them to limit family size. The *willingness* dimension suggests that family planning must also be perceived as morally acceptable on a personal and societal level, regardless of the utility gains it may entail. The final component – *ability* – designates the institutional and technical conditions determining the feasibility of family planning, including knowledge, access and availability of (or a lack thereof) contraceptive methods. Next, I draw on the "Ready-Willing-Able" framework to outline the directions and pathways whereby armed violence may influence women's and men's MCU.

Reduced contraception in armed conflict

Armed conflict can reduce MCU by modifying the costs associated with childbearing and thus the *readiness* and *willingness* to use contraception. Conflict-induced economic hardship and uncertainty may, for example, incentivise individuals and households to opt for larger families. This may translate into upward shifts in fertility preferences and demand for children and downward ones in their use and intention to use contraception (Chi et al., 2015, Thiede et al., 2020, Verwimp et al., 2020, Verwimp and Van Bavel, 2005). This scenario can be expected where having children is valued as an insurance strategy against economic shocks (Berrebi & Ostwald, 2015) as well as where violence increases child mortality. As families experience or anticipate the loss of a child, they may desire more children to replace deceased ones or compensate for their potential loss (Kraehnert et al., 2019, Nobles et al., 2015), leading to intentional contraception non-use. In settings where polygamy is common, as in Sahelian Africa, conflict-related incentives for larger families may result in changes in marriage structure and increases in polygamous unions (Fenske, 2015), which have been associated with lower use of contraception (Baschieri et al., 2013, Millogo et al., 2022).

Increased fertility demand and the resultant decline in MCU may reflect uncertainty around sexual partnerships and depend on gender roles in armed conflict (Svallfors & Billingsley, 2019). For example, men's greater risk of direct engagement in conflict activities, conscription, physical morbidity and mortality (Brunborg and Urdal, 2005, Hill et al., 2004, Plümper and Neumayer, 2006) may boost their desire to have children (Cohan & Cole, 2002) or encourage them to discount the future more heavily and indulge more frequently in unprotected sex (Raschky & Wang, 2012). Women's lower MCU in conflict settings may result from greater demand for children if they fear or experience separation from their partners or their death (Jok, 1999, Svallfors and Billingsley, 2019).

Situations of violence may affect the *ability* to access contraception due to factors that intersect at the individual, institutional and societal levels. For example, in times of violence, economic resources previously allocated to contraception may be no longer available. (Desiring) users may no longer know where to obtain modern methods, especially if healthcare services and the infrastructures providing family planning deteriorate or are destroyed (Behrman and Weitzman, 2016, McGinn et al., 2011, Nour, 2011). Conflict also brings several challenges, particularly (but not limited) to women, such as increases in sexual violence (Bendavid et al., 2021, El Jack, 2003, Schulz, 2021), intimate partner violence (IPV) (Ekhator-Mobayode et al., 2022, Svallfors, 2021a, Torrisi, 2023), sexual trafficking and exploitation (Chi et al., 2015, Martine and Guzman, 2002), which are all disempowering experiences that relate to lack of reproductive self-efficacy and control over contraceptive choices (Maxwell et al., 2015).

As healthcare systems in conflict-affected areas often suffer from infrastructural damage, scarce human and technical resources, weak management and ineffective coordination – even when humanitarian actors and resources are promptly mobilised (Checchi et al., 2016, Murray et al., 2002, Orcutt et al., 2019) – delivering even basic services and accessing them may prove extremely difficult, particularly to/for the poorest segments of the population (Krause et al., 2015, Martine and Guzman, 2002). Access may be further hampered if travel routes are disrupted/unsafe, mobility restrictions are imposed on the population, health personnel and/or relief organisations or if providers are directly attacked by armed groups (Mock et al., 2004, Ramos Jaraba et al., 2020). Finally, conflict may affect the ability to access contraception if institutional healthcare resources are relocated from SRH to emergency intervention, governmental resources are shifted towards the military sector or the flow of financial resources from international donors is interrupted (Behrman and Weitzman, 2016, Claeys, 2010, O'Hare and Southall, 2007, Onyango et al., 2013).

Increased contraception in armed conflict

For many similar factors, armed conflict can be expected to increase MCU. For instance, conflict-related economic instability, the threat of harm, and separation from partners due to military mobilisation or displacement may shift fertility preferences downward and encourage childbearing delay/limitation, eventually increasing the *willingness* to utilise contraception (Williams et al., 2012). Fearing deteriorations of medical care, loss of family and social support as well as increasingly precarious living conditions, individuals and couples may become more cautious about unwanted pregnancies and aware of the health costs of unprotected sex (Speizer, 2006). Especially where the prevalence of STIs is high, people may anticipate conflict-related surges in infections, thus increasing their demand for and use of modern contraception (Chi et al., 2015). The uptake of modern contraception can also rise if sexual violence is systematically used as a weapon of war and/or conflict escalates IPV (OSRSG-SVC, 2021, Svallfors and Billingsley, 2019).

As to *ability*-related factors, research in African countries has shown that when family planning services are provided to conflict-affected populations, women in specific will choose to use them (Casey et al., 2017, Casey and Tshipamba, 2017, Curry et al., 2015). In addition, while reversible methods may decline during armed conflicts, this reduction may be due to an increase in the uptake of sterilisation, especially where abortion laws are restrictive (Svallfors, 2022). Finally, armed conflict may only have a temporary impact – whether negative or positive – and levels of MCU quickly return to pre-conflict ones as insecurity becomes "chronic" or ends (Kidman et al., 2015).

Overall, although there are reasons to expect that conflict violence will alter MCU, extant knowledge does not allow to generate clear *a priori* hypotheses about which direction this shift may take and whether responses may vary by gender. The overarching aim of this study is thus to determine as neatly as possible the relationship between exposure to conflict and MCU, for women and men. Then only, to examine potential explanatory processes that may inform practical intervention.

The Malian context

Sexual and reproductive health in Mali

Before the insurrection, Mali had one of the lowest rates of MCU in the Sahel, estimated at 6% for both women and men of reproductive ages (Cellule de Planification et de Statistique et al., 2007). This low uptake has been a significant contributor to the country's high fertility rates (around 6.5 children per woman in the pre-conflict period), and levels of infant and maternal mortality (Johnston et al., 1998, UNICEF, 2023, WHO, 2019a).

To confront these issues and promote family planning, in the early 2000s, the government launched several national initiatives and programmes, including the Reproductive Health Strategic Plan (2004–2008) and the National Reproductive Health Communication Program (2007–2011) (Gage, 2007, Yoder et al., 2011). At the same time, the healthcare system was re-organised in a decentralised and community-based manner, with the aim of integrating family planning services into all levels of intervention (i.e., national, regional, district, health catchment area, etc…) and offering contraceptive methods through various providers (Johnston et al., 1998). Despite varying by method, generally, most modern contraceptive methods have been provided through local public services (e.g., community health centres, community health workers) or NGO visits (SHOPS Plus and USAID, 2021, Sidibe et al., 2020). For pills and condoms, private pharmacies, shops as well as street vendors have become, over time, the most common source (Castle, 2003, Pallin et al., 2013).

While government efforts to promote family planning led to significant improvements in child survival, access to antenatal and postnatal care (Assaf et al., 2020, Masset, 2022) and the availability of services/facilities (e.g., in the share of people living within 15 km from a health centre) (Johnston et al., 1998), they had a small influence on the adoption of modern methods of contraception (Mariko et al., 2009, O'Regan and Thompson, 2017). Just before the onset of the insurrection, only 4% of women were using some form of modern method in the North, 7-8% in the Centre and South-West and about 16% in Bamako. Health system factors, including underinvestment, insufficient facilities, supplies and personnel, transportation barriers, especially in rural areas (Gage, 2007; Johnston et al., 1998; Whidden et al., 2021), but also household structure (Adams et al., 2002, Castle, 1993), socio-cultural norms and traditional gender roles (Castle et al., 1999, Goldberg, 2003, Yoder et al., 2011) have been cited as contributors to these low MCU rates.

The 2012 Tuareg insurrection and the conflict

After 20 years of free elections and relatively peaceful transitions of power, Mali's reputation of "democratic success" and "model of good governance" in the Sahel (Solomon, 2013, Wing, 2013) fell apart in 2012, when Tuareg[1] rebels of the National Movement for the Liberation of Azawad (MNLA) with the support of Salafi-jihadist organisations (Al-Qaeda in Islamic Maghreb, Ansar Dine, and the Movement for Oneness and Jihad in West Africa) led an armed insurgency for independence that plunged the country into war (Chauzal & Damme, 2015).

In January, the Islamist groups and the MLNA – which was mostly composed of Malian Tuareg mercenaries who had fought for Muammar Gaddafi during the 2011 Libyan Civil War and had returned heavily armed after his death (Chena & Tisseron, 2013) – attacked and evicted governmental security forces in Northern Mali. Soon after, in March 2012, dissatisfaction with the central government's response to the insurgency triggered an army mutiny and, eventually, a *coup d'état* against the democratically elected President Touré (Whitehouse, 2012). The putsch accelerated the rebels' insurrection and the urbanisation of the conflict (Radil et al., 2022). In just a month, the separatists seized the key commercial and religious centres of Tombouctou, Kidal, and Gao, and declared the independence of Northern Mali (also known as "Azawad") (Figure 1). Meanwhile, a power struggle emerged between the rebel groups. Jihadist groups ousted the MNLA from the North and began to expand southwards. To stop their progress, in January 2013, French and African Union forces launched "Operation Serval", a military intervention which dispersed the jihadists and allowed the central government to reconquer the occupied areas (Hanne, 2015). Nevertheless, despite the deployment of an UN-led peacekeeping mission (MINUSMA) and two peace agreements between Mali's government and some insurgent groups in 2014-

[1] The Tuaregs are a semi-nomadic population of Berber heritage, typically of Sunni Sufi orientation. They represent about 10% of Mali's total population and mostly live in its Northern territories.

2015, Northern Mali continues to be insecure and contested. While urban violence has not ceased, and cities remain key targets for violent attacks,[2] in recent years jihadist groups and violent events have extended to rural areas of Central Mali (Benjaminsen and Ba, 2019, Radil et al., 2022, Thurston, 2020b).

Tuareg separatism, driven by historical economic grievances and perceived political marginalisation,[3] had already affected Mali multiple times since its independence.[4] However, the 2012 insurrection had some distinctive features compared to prior rebellions. First, its timing was abrupt: the sudden fall of Gaddafi's regime in Libya prompted an influx of highly trained and heavily armed Tuareg fighters to the North that the central government was not able to disarm and re-integrate (Ananyev and Poyker, 2023, Boeke and de Valk, 2021, Kuperman, 2015, Shaw, 2013). Second, with the emergence of Islamist armed groups operating along with/parallel to Tuareg rebels, the one in Mali represents a hybrid form of conflict – mixing political grievances, separatism, criminal activity and Islamic terrorism (Briscoe, 2014) – which appears to be proliferating in Sahelian Africa. Because of this hybridity, the 2012 insurrection has been described as the greatest threat to the stability of Mali as a state and the most violent episode of conflict since independence (Chauzal and Damme, 2015, Kimenyi et al., 2014). According to the Uppsala Conflict Data Program Georeferenced Event Data (UPCD-GED), an average of 8 conflict events was reported across 2000-2010[5] compared to one of 190 across years of the following decade, with fatalities spiking in 2013, 2018 and 2020 (Figure 2).

[2] For example, in 2015 an hotel attack caused 22 casualties in Bamako. In 2017, a suicide bomb in Gao killed 77 people and injured more than 100.

[3] This section seeks to summarise as neutrally as possible the chronological and spatial development of the recent conflict using available sources and official documents. It does not suggest any specific stance on the dispute. In this context, it is thus important to highlight that while there is some data to support the perception of marginalisation of the Malian Tuaregs, there is also evidence that indicates that before the conflict the North performed better than the rest of Mali (excluding the capital Bamako) on some socio-demographic indicators. For example, the World Bank (2015) indicated that Kidal and Gao had lower levels of chronic malnutrition relative to other regions, and that Kidal had the highest levels of literacy among household heads and the lowest mortality rate. In addition, economic data showed that about 70% of all poor resided in three livelihood zones in southern Mali and that, after Bamako, per capita consumption was highest in the North (Wee et al., 2014).

[4] These include the uprisings of 1963, 1991 and 2007, which were all followed by peace agreements. See Galy (2013) for a detailed description of Mali's conflict history.

[5] The Armed Conflict Location & Event Data Project (ACLED) reports an average of 10 for the same period.

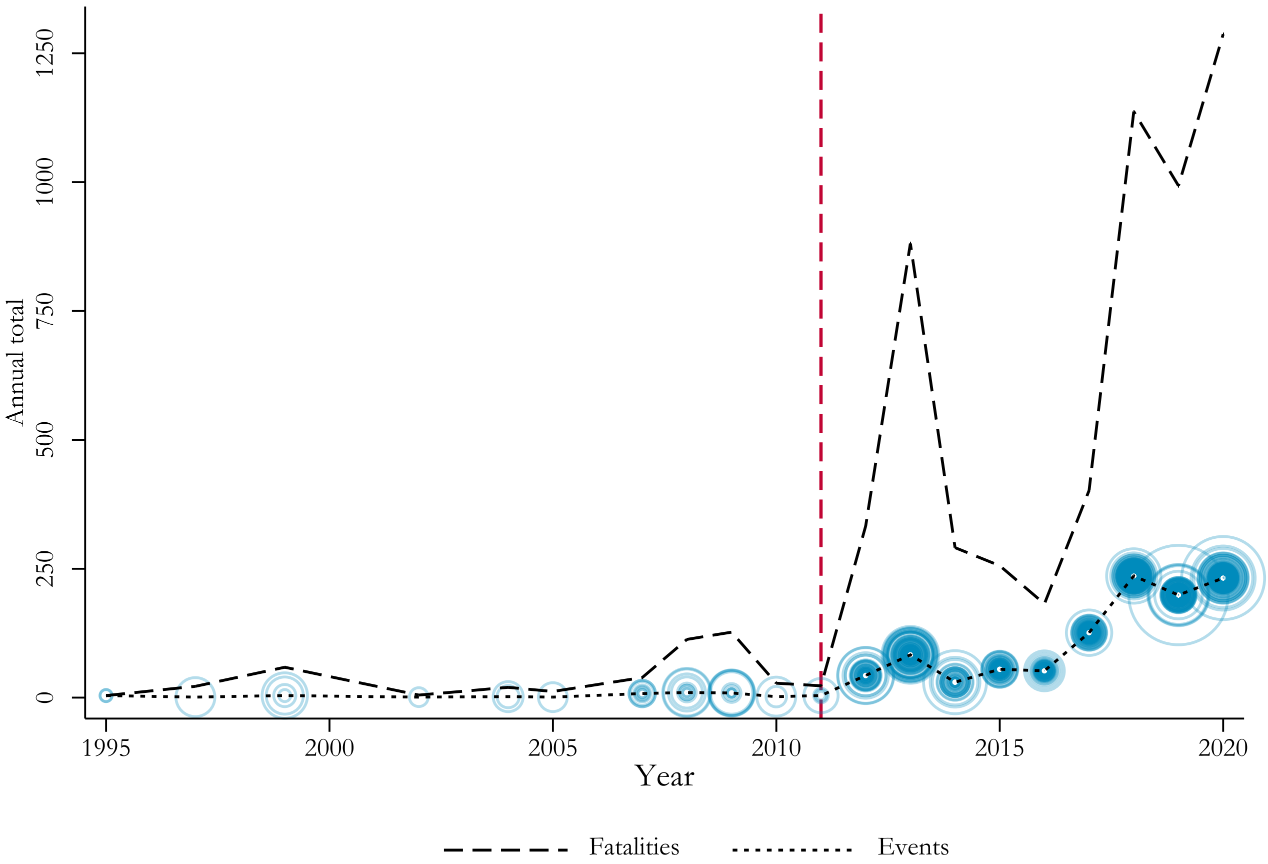
Figure 1 Map of Mali and contested territories

Source: DIVA-GIS for shapefile, HDX-UNOCHA for population density. Notes: White area corresponds to Central-Southern Mali. Pink areas correspond to the 'Azawad' territories, i.e., the contested territories of Northern Mali. Dots show population density per km^2 (2018).

The conflict had dramatic impacts on the Malian people: under-5 mortality increased markedly in the areas affected by the insurrection (Masset, 2022). Between 375-500,000 people fled their homes[6], and many of those who returned after the peak of the crisis found their assets and livestock decimated (Hoogeveen et al., 2019). Daily mobility was significantly reduced, particularly for women (International Crisis Group, 2019). Gender-based violence, both inside and outside the household, increased (Ekhator-Mobayode et al., 2021; OSRSG-SVC, 2021). Public infrastructures, including schools, water and electricity services were physically damaged or destroyed (World Bank, 2016), and agricultural productivity was compromised, leading to rising prices and food insecurity (Kimenyi et al., 2014).

[6] According to IDMC (2014), IOM (2016) and UNHCR data (2016, 2019), there were around 220,000 internally displaced persons (IDPs) in 2013. After the 2014-2015 agreements, the figure dropped to 37,000 (2016) due to large waves of returnees and rose again to 55,000 after violence re-escalated in 2018. As of June 2019, about 139,000 Malian refugees were estimated to be in Burkina Faso, Mauritania and Niger.

Figure 2. Conflict events and violence-related fatalities, Mali 1995-2020



Source: UCDP-GED (2023). Notes: Blue dots represent conflict events in each year with size weighted by recorded conflict fatalities. Numbers of conflict-related fatalities according to the source "best-estimate" value.

The 2012 insurrection undermined an already precarious healthcare infrastructure and led to significant disruptions in basic medical service provision in the affected areas, including the delivery and availability of SRH services (World Bank, 2016). In conflict-affected areas, the withdrawal of government forces, frequent targeted attacks on medical centres (Safeguarding Health in Conflict (SHCC), 2021, 2018)[7], together with the initial suspension of nearly all public development assistance from international donors due to concerns of misappropriation and/or diversion for jihadist purposes, ushered a steady decline in the number of functional health facilities (Paul et al., 2014, WHO, 2013). It has been estimated that about 77% of healthcare workers abandoned Northern Mali during the conflict (Ataullahjan et al., 2020) and over a quarter of medical structures providing SRH services in the North have been classified as non-functional (Tunçalp et al., 2015, WHO, 2019b). SRH facilities that were not damaged had to navigate considerable operational challenges due to a lack of equipment and qualified staff (Debarre, 2019). Although the UN Office for the Coordination of Humanitarian Affairs (OCHA) activated its cluster system in April 2012 to respond to the crisis, humanitarian efforts continued to suffer from insufficient

[7] For example, in June 2017, Médecins Sans Frontières (MSF) halted its activities in Kidal after a series of violent robberies took place in its compounds in less than a month. In the same year, UNICEF (2017) reported 59 attacks on hospitals and schools and 109 violent incidents hindering humanitarian aid.

coordination and fragmentation, reportedly creating gaps in SRH delivery and coverage (Ataullahjan et al., 2020, Debarre, 2018). Moreover, the increasingly jihadist connotation of the Malian conflict had severe implications for women's reproductive autonomy. Jihadist rebels reportedly burned condoms and contraceptives, shut down pharmacies providing such services (Bastagli and Toulmin, 2014, Kimenyi et al., 2014), and monitored women during health visits to ensure they would not obtain contraceptives (Degni et al., 2015).

Empirical strategy

Data

This study combines two sources of data to examine the relationship between conflict and MCU in Mali. The first are the Mali Demographic and Health Surveys (M-DHS) conducted in 2006 and 2018. These are cross-sectional nationally representative household surveys collecting rich demographic and population health information, including fertility preferences, contraceptive use, knowledge, and attitudes from women (aged 15-49) and men (aged 15-59) for the periods before and after the onset of the insurrection.[8] The two surveys ask identical questions, allowing comparisons across time and space. Importantly, both M-DHS include geocoded information on sampled clusters' locations, which enables spatial join with my second data source, i.e., georeferenced conflict event datasets.

Specifically, I rely on the Uppsala Conflict Data Program Georeferenced Event Data (UPCD-GED) (Croicu and Sundberg, 2015, Sundberg and Melander, 2013) and the Armed Conflict Location & Event Data Project (ACLED) (Raleigh et al., 2010). These datasets are similar, in that both provide spatial and chronological coordinates of conflict events based on global news reporting as well as secondary sources like local media, field reports, NGOs and IGOs reports and have been widely used in research on the demographic and health consequences of armed violence (e.g., Elveborg-Lindskog, 2016, Svallfors, 2021b, Thiede et al., 2020, Torrisi, 2022). UCDP-GED includes one record for each conflict event in which it was believed that at least one person was killed. For each event, the dataset provides a low, best and high casualty estimate. ACLED relies on a less restrictive definition of conflict incidents, which requires no fatality threshold. This means that ACLED also counts non-fatal events (e.g., events causing injuries, sexual violence) and non-strictly violent conflict episodes (e.g., troop movements, demonstrations, riots). ACLED is thus allegedly more inclusive, but also less precise and less definitionally clear.[9] As a recent review of the two datasets concluded (Eck, 2012), UCDP-GED is

[8] M-DHS were also conducted in 1995-1996, 2001 and 2012. I later use data from the first two for descriptive purposes. I do not use the 2012 round because it did not sample the regions of Toumboucto u, Gao and Kidal for security concerns. Two Multiple Indicators Cluster Surveys (MICS) were also conducted before and after the insurrection (2010, 2015). I do not use these alternative data sources in the models because MICS lack the GPS cluster coordinates needed to precisely identify if respondents were affected by violence and because they did not ask comparable questions on MCU to men.

[9] ACLED has been used more often in studies on African countries because it has longer time series than UCDP-GED.

deemed to provide superior data in terms of event and fatality counts, transparency and geocoding precision. Accordingly, most of the discussion below focuses on estimates from models using UCDP-GED data. I report estimates from models using ACLED-based measures as a check and assess any change resulting from the inclusion of non-strictly lethal conflict events.[10]

Variables

Outcome variables

Information on MCU comes from the M-DHS, which include a module on contraception in both the women's and men's questionnaires. I start by measuring *modern contraceptive use* with a binary variable that takes the value of 1 if the respondent reports being currently using any modern method, (contraceptive pills, IUD, injections, male or female condoms, implants, foam or jelly) and zero otherwise.[11] The rationale for using binary variables relates to the low reported prevalence of traditional methods (withdrawal, periodic abstinence, or other traditional/folk methods were reported by *n*=218 women and *n*=120 men) and to ease the interpretability of the results.[12] Next, I examine the *type of modern method* used by respondents' gender. I create binary indicators for whether the woman reports using (i) injections, (ii) pills, or (iii) implants and, whether the man uses (iv) male condoms. These were the most common gender-specific methods before and after the insurrection (Table A1). In addition, I look at whether respondents (v) used male condoms in their most recent sexual encounter for two reasons. First, questions about condom use during the most recent intercourse are likely more reliable than ones asking about current condom use in general. Second, prior qualitative research in Mali showed that this is a highly preferred method, especially among young (unpartnered) women, as male condoms are perceived to have fewer side effects on women's health, current and future social status (Castle, 2003). Analysing male condom use is important also because of its dual protection against unwanted pregnancy and STIs.

Conflict exposure may not only affect current MCU, but also one's *intention to use contraception*. I thus construct an indicator measuring whether non-using women intend to use a modern method in the future.[13] Finally, I assess the relationship between exposure to violence and *current pregnancy* with a

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[10] Since interest lies in armed violence specifically rather than in generalised forms of unrest, I follow Thiede et al. (2020) and exclude events that ACLED codes as protests and riots. I also exclude abductions and sexual violence committed by unidentified actors, which may be unrelated to the insurrection and thus not comparable with UCDP-GED data.

[11] In specific, respondents are first asked "*Are you or your partner currently doing anything or using any method to delay or avoid getting pregnant?*". Those responding affirmatively are asked to report which method they are using (modern or traditional methods as defined in the text). Note that respondents are only allowed to select one method among response options. This represents another reason justifying my investigation of women's reports of condom use at last sex as it is possible that some women may be using both hormonal and barrier methods concurrently.

[12] Nevertheless, I provide evidence that results are unchanged once outcomes on contraceptive use are coded with a three-level categorical variable (no method, traditional method, modern method) in multinomial logistic models.

[13] This question was not asked in men's questionnaires and to women who reported using a method at survey time.

dichotomous variable for whether the woman/man's partner was pregnant at survey time. For pregnant female respondents, I create an indicator for whether the *current pregnancy is unwanted*. Since current pregnancy indicators may be related to seasonal variation and the slightly different timing of M-DHS data collection, I run sensitivity tests limiting the sample to respondents interviewed in the two survey rounds' matching months (August-November).[14]

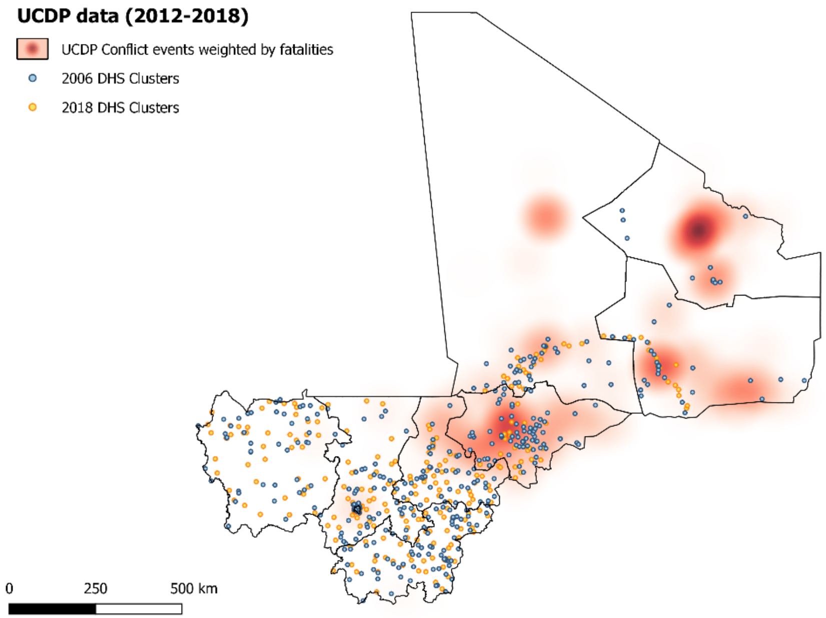
Conflict measurement

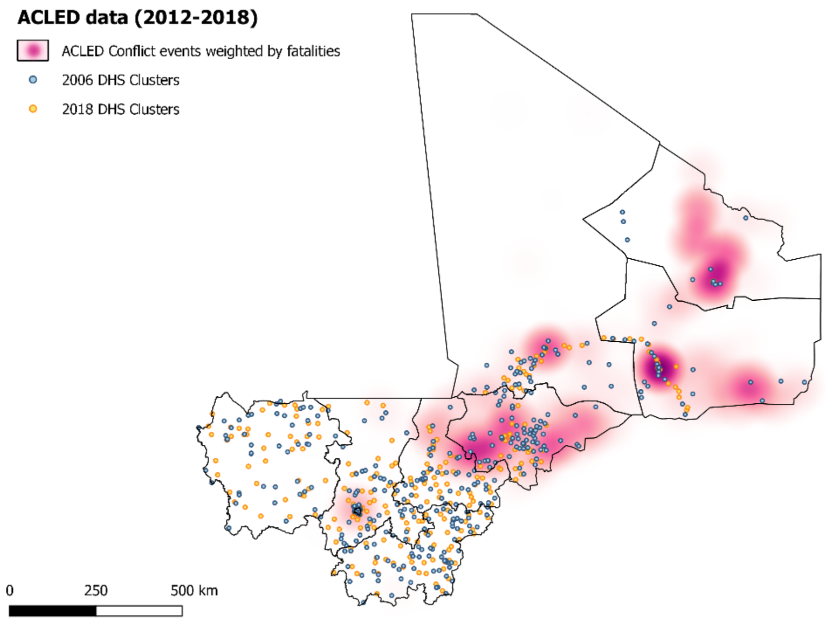
I rely either on UCDP-GED or ACLED data to determine if a respondent experienced violence and construct the conflict indicators in steps. I begin by mapping conflict events recorded between January 2012-Novermber 2018 (i.e., end of the 2018 M-DHS data collection) using the point coordinates provided in respective datasets. Next, I determine a "catchment" area for each event by creating circles ("buffer") of different radii –10, 15 and 20 km – centred at the latitude/longitude of the conflict events. I examine different buffer radii because the M-DHS randomly displace cluster coordinates by up to 5 km (0-2 km in urban areas, 0-5 km in rural areas) to safeguard respondents' privacy (Burgert et al. 2013). Testing different catchment areas may be also informative of the mechanisms if, for example, the relationship between conflict and contraception is linked to a lack of nearby health facilities (Østby et al., 2018). Moreover, the choice of 10-20 km buffer radii and not larger catchment areas is guided by recent research which found that daily life experiences of both women and men were highly dependent on jihadist/insurgent activities in their "localised realities" (Chauzal & Gorman, 2019). As a final step, I project geocoded M-DHS cluster locations and geographically join them with conflict buffers (Figure 3). This strategy, increasingly used in similar research (e.g., Kotsadam and Østby, 2019, Østby et al., 2018, Thiede et al., 2020, Torrisi, 2023), enables to identify respondents who, at survey time, were in clusters intersecting, touching or contained in the "catchment" radius area of each conflict event. These respondents are considered "conflict-affected". About 26-34% of women and 25-33% of men in 2018 lived within 10 km of a UCDP-GED or ACLED-recorded conflict event (Table A1).

I build alternative indicators, including (i) a continuous variable for the number of conflict events that occurred within 10, 15 or 20 km from the respondent's cluster, and (ii) a discrete variable categorising the cumulative number of violent events within these buffer radii into "None", "Low", "Medium" and "High" based on the percentile distribution reported by each conflict data source. These additional measures serve as tests to the binary indicators, and to examine heterogeneity by conflict intensity.

[14] The 2006 M-DHS was conducted between April-December, while the 2018 wave between August-November.

Figure 3. Map of the Malian conflict (2012-2018) and M-DHS clusters, by conflict data source





Source: ACLED (2023) and UCDP-GED (2023). Notes: Colour intensity of the circles is weighted by the number of reported fatalities caused by each conflict event. UCDP-GED casualties according to the source "best-estimate" value.

Impact pathways

I generate a set of indicators to examine the potential pathways driving the relationship between conflict exposure and MCU. First, I investigate whether violence is related to people's *readiness* to use contraception via changes in the *desire and demand for children* with (i) a continuous variable capturing respondents' ideal number of children[15] and with binary indicators for whether the respondent (ii) desires no more children, (iii) is undecided, and (iv) wants more children within a year or less. Only respondents reporting a desire for more children are asked the question used to build this latter indicator. Since lower demand for contraception may be driven by changes in *sexual activity* due, for example, to couple separation, psychological factors or changes in marriage structures, I build a measure for sexual activity in the last month (Svallfors & Billingsley, 2019).

Next, I examine factors related to partnership dynamics, female empowerment in the household and attitudes towards contraception that may influence one's *ability to use* contraceptives. For women, I create indicators measuring whether respondents (i) take decisions about their health alone/jointly with other persons or if these are made exclusively by someone else, (ii) can ask their partner to use condoms and (iii) can refuse sex. The latter two variables are asked to partnered women only. For men, I look at whether the respondent believes that (i) contraception is a woman's business and men should not worry about it, and (ii) women who use contraception become promiscuous. Finally, to gauge whether the conflict influenced women's *ability to access* contraception, I build a variable measuring whether the woman knows where to obtain a modern method. Since no similar variable was collected in 2018 for men, this pathway is only examined in the women's sample

Estimation strategy and assumptions

Empirical approach

I examine whether and how the 2012 insurrection influenced MCU in Mali adopting a difference-in-difference (DID) logic that exploits spatial and temporal variation in conflict intensity. In specific, I estimate the following linear probability model:

$$SRH_{iat} = \beta_0 + \beta_1 \text{ConflictPeriod}_t + \beta_2 \text{AffectedArea}_a + \beta_3 \text{ConflictPeriod}_t \times \text{AffectedArea}_a + \ldots + \beta_k X_{iat} \quad (1)$$

where SRH_{iat} indicates any of the reproductive health outcomes discussed above (e.g., any modern method, pill/injectable/condom use…) for individual *i*, interviewed in area *a* in time period *t*.

[15] Following Thiede et al. (2020), the variable on ideal number of children excludes non-numeric responses.

$ConflictPeriod_t$ is a binary variable coded 0 for the base period (i.e., survey year 2006) and 1 for the post-insurrection period (i.e., survey year 2018). In the main specification, $AffectedArea_a$ indicates whether the respondent was interviewed in a cluster that was within 10 km radius of a conflict event. In alternative estimations, as explained above, I examine larger buffer radii, continuous and discrete indicators for the number of events within a given radius from the respondent's location.

The coefficient β_3 of the interaction term identifies the relationship between conflict exposure and a given SRH outcome in the post-insurrection period. Alternatively stated, β_3 measures the average relationship between being in a conflict-affected area after the start of the insurrection and the outcomes. Because this relationship could be influenced by respondents' characteristics that correlate with conflict, I add a set of individual variables (X_{iat}) that include respondents' age, urban residence, religion, literacy, employment status, ethnicity, children ever born, and union type (single, monogamous union, polygamous union, widowed/divorced/separated). This vector further includes region dummies that capture differences in socio-economic conditions between regional units.[16] In additional analyses considering only partnered respondents, I add partner's literacy level. All estimates are weighted using survey weights provided by the M-DHS and robust standard errors are clustered at the primary sampling unit level (Bertrand et al., 2004).

I exclude infecund (female: *n*=1,168, male: *n*=125) and sterilised respondents (female: *n*=56, male: *n*=30), as well as menopausal and amenorrhoeic women. Infecund and sterilised respondents are excluded because it was not possible to know when they became infecund/adopted irreversible methods in relation to the conflict (Svallfors & Billingsley, 2019).[17] In the main analyses on MCU, the sample also excludes currently pregnant women, except when the dependent variable captures condom use at last intercourse since pregnant women may use condoms to avoid STIs.[18] After these restrictions, the final (weighted) samples consist of *N*=17,570 women and *N*=4,185 men aged 15-49/59 who may use modern contraception. Descriptive statistics for both samples are in Table A1. In alternative specifications, I restrict the female sample to women who (i) did not give birth in the year before the survey (*N*=13,097), and (ii) ever had sex (*N*=15,381).[19]

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[16] Except for employment status, which I use later to examine migration bias, I exclude covariates that may be deemed post-treatment, e.g., wealth in 2018 since the conflict may have influenced them (Behrman & Weitzman, 2016).
[17] The M-DHS asks about years since sterilisation, but responses are categorised in 2-year intervals (e.g., <2, 2-3, 4-5 years), which do not allow to precisely identify when the procedure took place. Similarly, while conflict may lead to infecundity, e.g., via the spread of STIs, the temporal sequencing of event is hard to determine with the M-DHS.
[18] These respondents (*n*=2,564) are included, for obvious reasons, in analyses of current (unwanted) pregnancy.
[19] Questions on contraception and fertility preferences were only asked to men who ever had sex.

Identification issues and estimation bias

The ideal scenario for standard DID models would be to have longitudinal data following the same, randomly selected respondents over time. This would ensure sample stability and allow for individual effects. However, only cross-sectional data are available for this study and conflict-affected and less-affected respondents are not chosen at random. This means that the two groups may be very different from one another. Table A2 (Appendix) suggests that respondents in conflict-affected areas are, expectedly, more urbanised, but also more likely to be literate, Muslim and have fewer children. As a minimum strategy to control for such structural differences, I add the set of variables X_i in the models as explained above. In supplementary analyses, I augment Eq. (1) with an interaction term between X_i and the time indicator to control for group-specific trends in observables (Angrist & Pischke, 2014). Since urban and peri-urban areas were, at least at the start of the conflict, the most affected by violent insurrection (Radil et al., 2022), I re-run all models without the urban control variable, excluding observations in the capital Bamako, and with an interaction between urban residence and the DID term to further examine whether the insurrection had differential implications in urban and rural areas. I also examine models without region dummies since these may capture unmeasured conflict events e.g., if events in Toumbouctou went unreported at a higher rate than events elsewhere in Mali, thereby underestimating the relation between conflict and SRH.

Nevertheless, a key concern about the comparability of the two groups remains because of selection due to mortality and population displacement. Conflict-related mortality is typically concentrated among young men and the poorest segments of the population (Plümper & Neumayer, 2006). Thus, estimates may be biased downward if, for example, the poorest, who often face the greatest difficulties in accessing SRH, are underrepresented in the sample because of greater mortality. The opposite could be expected if young men, who may be more likely to use condoms, are selected out of the sample because of death. Similarly, conflict-related population movements could affect the population composition in the affected areas and introduce upward bias if wealthier groups had enough resources to leave the conflict-affected areas, or downward bias if wealthier individuals were somehow less impacted by the insurrection and, thus, less likely to leave the affected areas than poorer individuals. Anecdotal evidence suggests that large population movements occurred at the start of the conflict (World Bank, 2016). At the same time, one recent study using panel data collected between 2012-2017 among Malians in Mopti found very little rates of attrition, both at the individual- and household-level, concluding that "no substantial migration away from the area took place after the conflict" (Masset et al., 2019, p. 16). This study also showed that young age, being female and being more educated were the only characteristics correlated with migration from the area. Another study using mobile phone-based panel interviews to trace migratory decisions during the crisis found that farming households – the largest segment of Mali's population – were unlikely to leave their homes, and that it was mostly individuals working in commerce who migrated away from conflict zones (Hoogeveen et al., 2019). According to the same study, many of these IDPs had returned to their homes by August 2014 and, among those who had not yet returned, 81% intended to do so.

I build on this evidence to explore and address potential bias due to selective migration. As a first crude assessment, I use the M-DHS question on respondents' number of years lived in their current place of residence and limit the sample to observations living in their place of residence for the entire duration of the insurrection (women: N=16,261, men: N=3,905), i.e., respondents who reported living in the same location for at least seven years (similar to Masset (2022)'s approach). Next, I re-run the analyses excluding observations from the 2006 M-DHS located in areas in eastern Gao and Kidal that had no nearby comparable sampled cluster in 2018 (Figure 3). Lastly, I follow Ekhator-Mobayode et al. (2021, 2022) and employ a kernel-based propensity score matching (PSM) method to ensure that the profiles and composition of respondents in the conflict-affected and less-affected areas are similar based on observable characteristics. Building on the evidence cited above on factors associated with the decision to flee from the insurrection (Caliendo and Kopeinig, 2008, Hoogeveen et al., 2019, Masset et al., 2019), I match each respondent in (i) less-affected areas *before* conflict onset, (ii) less-affected areas *after* conflict onset and (iii) conflict-affected areas *before* conflict onset ("control") to respondents in conflict-affected areas *after* the insurgency ("treated") according to individual-level information on age, education, employment status and religion. In this way, I create a balanced control group that does not systematically differ from respondents in the conflict-affected areas based on observables (Figure A3). Then, I apply the matching weights to re-estimate β_3 in Eq. (1) on the common support sample, namely on a sample of respondents who reside in the conflict-affected areas for whom counterfactuals are found in each of the three "control" groups. I run PSM models for both the full and the non-migrant matched samples.

A third key assumption of standard DID models is that there are no time-varying unobservable factors that would influence trends in MCU in the conflict-affected and less-affected groups differently, i.e., that without the insurrection, trends in MCU between affected and less-affected areas would be the same. While this assumption cannot be directly tested, Figure A1 – which shows the spatial distribution of conflict events against regional MCU levels in 2006 – gives a first crude indication that heightened violence did not specifically occur where initial levels of MCU were higher (i.e. where there was greater risk of deterioration, e.g., because of physical destruction of health facilities) or lower (where there was larger margin for adopting methods, e.g., through humanitarian assistance).

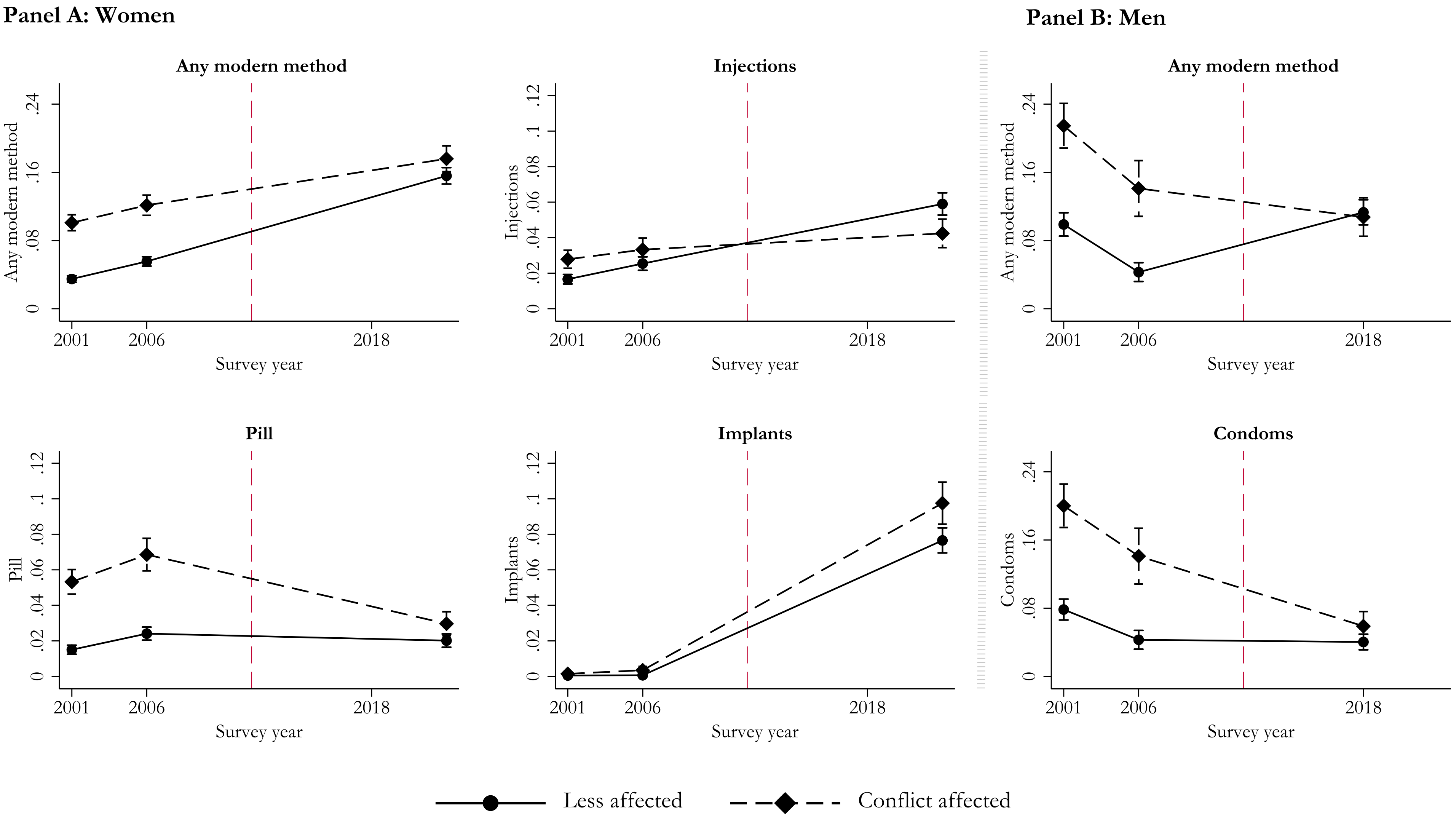
More detailed evidence emerges from Figure 4 and the respective tabular information in Table 1. These show trends in MCU and for women (Panel A) and men (Panel B) over time, in conflict-affected and less-affected areas. Between 2001-2018, women's use of any modern contraceptive method, albeit low, increased in both conflict-affected and less-affected areas in a fairly parallel way. However, the overall gain appears to be larger in the less-affected areas, and particularly driven by increases in the peaceful

South-West and stalls in the North and the capital (Figure A2, Panel A). In specific, in less-affected areas, women's MCU rose from about 5.5% in the pre-insurrection period to 15.5% in 2018, with most of the increase attributable to injectables and implants (Table 1). By contrast, the lower increase of MCU in conflict-affected areas (from 12% to 17%) primarily appears to result from a drop in the use of pills and less rapid adoption of injectables, likely in violent areas near the capital Bamako. Table 1 also suggests that in conflict-affected areas, women's intention to use modern contraception as well as unwanted pregnancies significantly increased between the pre- and post-insurrection periods.

A different trend emerges for men's use of modern contraception: while the use of any method of contraception (including methods controlled by female sexual partners) increased from 5% in the pre-conflict period to about 11% in 2018 in less-affected areas, it fell in conflict-affected areas. In these zones, the drop was considerable for men's use of condoms. While most of this decline appears to have occurred in violent areas around the capital region, reductions in condom use also took place in the North (Figure A2). By contrast, the higher levels in men's MCU in the peaceful South-West seem to be attributable to concurrent stable use of condoms and greater use of female methods.

Overall, these raw measures seemingly suggest that – against the background of an overall temporal increase in women's MCU and a decline in men's condom use – the insurgency slowed down progress in family planning. Importantly, graphs in Figure 4 suggest that trends in MCU between conflict-affected and less-affected areas were moving largely in the same direction in the pre-conflict period, offering support to the parallel trend assumption. To further check this is the case, I later run a placebo analysis where I replicate the estimations using the 2001 and 2006 M-DHS waves (i.e., samples of respondents in the pre-insurrection period only) and build the $ConflictPeriod_t$ variable so that it takes the value 1 for respondents observed in the 2006 survey and 0 for those interviewed in 2001.

Figure 4. Trends in contraceptive use for women (Panel A) and men (Panel B)



Source: 2001, 2006, 2018 M-DHS. The dashed line represents conflict-affected areas, using UCDP-GED 10 km buffer. The solid line represents less affected areas.

Table 1. Modern contraceptive use in Mali before (2006) and after the insurrection (2018)

Panel A: WOMEN

	Conflict-affected areas				Less-affected areas			
	2006	2018	Diff.		2006	2018	Diff.	
Variables								
Currently using modern contraception	12.14	17.59	5.45	***	5.55	15.59	10.04	***
Currently using pills	6.86	2.97	-3.89	**	2.41	2.02	-0.39	
Currently using injections	3.33	4.24	0.91		2.54	5.90	3.36	***
Currently using implants	0.35	9.75	9.41	***	0.06	7.66	7.59	***
Condom use at last sex[a]	3.47	4.42	0.94		1.53	0.91	-0.62	*
Intends to use contraception in the future (non-users)[b]	33.12	48.64	15.52	***	37.75	40.91	3.16	
(Partner) currently pregnant[c]	10.84	11.05	0.21		14.68	11.87	-2.81	***
Current pregnancy not wanted[d]	12.17	24.41	12.24	**	20.43	19.28	-1.15	
Observations	2,824	2,018			6,855	5,873		

Panel B: MEN

	Conflict-affected areas				Less-affected areas			
	2006	2018	Diff.		2006	2018	Diff.	
Variables								
Currently using modern contraception	15.10	10.75	-4.35		5.18	11.31	6.13	***
Currently using condom	14.15	5.89	-8.21	**	4.29	4.03	-0.26	
Condom use at last sex[a]	16.73	3.64	-13.09	***	4.82	1.93	-2.89	**
Partner is currently pregnant	10.72	10.84	0.12		20.45	14.06	-6.39	**
Observations	348	611			1,340	1,886		

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict indicator. Notes: Observations are weighted using survey weights. [a] Asked only to sexually active respondents (2006: N=9,286 women and N=1,688 men; 2018: N=7,318 women and N=2,497 men). [b] Asked only to women who reported no current use of modern contraception (2006: *N*=8,878; 2018: *N*=6,384). [c] Here the sample further includes currently pregnant women (2006: *N*=1,523; 2018: *N*=1,041). [d] Asked only to currently pregnant women (2006: *N*=1,523; 2018: *N*=1,041). Significant at †p<0.1; p<0.05; **p<0.01; ***p<0.001.

Results

Contraceptive use and intention to use

The raw figures in Table 1 suggest that the adoption of modern methods was more limited for women and halted for men in conflict-affected areas in the post-insurrection period. Table 2 next presents the results of models estimated with a DID logic and measures of conflict based on UCDP-GED data, for women (Panel A) and men (Panel B). Column (1) shows baseline estimates (i.e., a model with no covariates, except region dummies) for any modern method of contraception. Columns (2)-(6) report fully-adjusted estimates for any method and gender-specific ones. Column (7) examines the relationship with condom use at last sexual intercourse for sexually active respondents, while Column (8) shows the results for intention to use modern methods.[20]

Estimates indicate that local exposure to insurrectionist violence is overall associated with a decline in MCU for both women and men. The probability of being a current user of any modern method in the post-insurrection period is 4 and 7.6 percentage points lower for conflict-affected women and men respectively. Method-specific models show significant declines in the use of shorter-acting methods associated with the insurrection: for women, drops are observed for both pills and injections, which were the most common female methods before the conflict; for men, conflict exposure is linked to a reduction in the use of condoms, especially during the last intercourse. No relationship is observed with implants, whose use prevalence was near zero in peacetime. Notably, the insurrection is associated with almost a 7-percentage points increase in the intention to use modern methods for non-using women in conflict areas (Col. 8).

Since a decline in MCU may actually reflect an increase in traditional methods, I test the findings with multinomial logistic regressions and predicted probabilities for all outcomes (i.e., using no method, traditional or modern methods) (Figure A4). Results remain largely consistent: conflict exposure is associated with reductions in MCU among women compared to no method (relative risk ratio (RRR)=0.466, p-value<0.001) and with declines in condom use among men (RRR=0.711, p-value=0.051) versus no method. I find no statistical difference in men's and women's propensity to use traditional methods versus no method at all.

Pregnancy outcomes

Between 2006-2018, the shares of current pregnancies and current unwanted pregnancies were overall declining (Table A1). However, results in Table 2 (Cols. 9-10) indicate a positive association between conflict exposure and women's probability of being currently pregnant, and that the current pregnancy is unwanted. Likewise, for men, the insurrection is related to a greater probability of having a pregnant partner. Altogether, thus these results suggest that the insurrection halted an already limited use of modern contraception, with some repercussions on fertility dynamics.

[20] To address the issue of multiple hypothesis testing, in the main tables I also report p-values correcting for family-wise error rate (FWR) following Romano and Wolf (2005, 2016) and Clarke et al. (2020). This correction method allows to place each outcome in a family of related outcomes (i.e., gender-specific SRH outcomes; gender-specific mechanisms). It then calculates a t-statistic of the hypothesis that the conflict influenced the outcomes. This is computed for each outcome and then the obtained t-statistics are ranked from the largest to the smallest within each family. The largest observed t-statistic is then compared with the maximal bootstrap distribution (here set at 1,000 replications). The reported FWER p-value indicates the probability of observing the original t-statistic larger than the bootstrap distribution of t-statistics. This method has been used in similar research (De Juan & Koos, 2021; Justino et al., 2022) and it is considered an improvement to the Bonferroni adjustment as it accounts for interdependence across outcomes.

Potential mechanisms

A first reason for the observed negative relationship between the insurrection and MCU may be related to shifts in family preferences, including changes in demand for children (Nobles et al., 2015).[21] Columns (1)-(4) in Table 3 show the results of models assessing this hypothesis. While there is no evidence that the insurrection influenced women's fertility preferences, it is associated with measures indicating lower demand for children among men. Conflict-affected men in the post-insurrection period desire fewer children, do not want a(nother) child(ren) and are less uncertain about the next birth. Moreover, the insurrection is associated, though moderately, with a higher probability that male respondents are sexually active (Col. 5). This perhaps suggests some 'supply-side' unmet need (Senderowicz and Maloney, 2022) for male contraception given the misalignment with declining fertility preferences and condom use.[22]

Since changing fertility preferences do not seem to explain much of the results observed for women, I next examine issues of access. Specifically, I look at whether the insurrection had any influence on women's knowledge about where to obtain modern contraception. For the sub-sample of non-users who also reported not wanting to have a child (ever, within a year or more), it is also possible to exploit data on self-reported reasons for contraceptive non-use and evaluate if the conflict influenced access barriers. Specifically, I draw on Senderowicz and Maloney (2022)'s "strictest" definition of access, which considers geographic, financial and administrative barriers preventing contraceptive use (that is non-using modern methods because of (i) physical distance, (ii) cost, (iii) lack of knowledge on providers or method and (iv) lack of method availability).[23] Results indicate that the conflict is associated with a significant decline in knowledge about where to obtain modern contraception (Col. 6). Among non-users, violence is also linked to a greater likelihood of reporting 'supply-side' barriers as reasons for non-use (Col. 7). Although this latter result may be due to smaller cell numbers in conflict areas, altogether findings suggest that temporal gains in contraceptive knowledge, access/availability for women (Table A1) were likely not shared equally, with those affected by violence facing higher 'supply-side' barriers.

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[21] Another way conflict may affect family preferences is through changes in marriage structure. For example, the insurrection may have increased the prevalence of polygamous unions (Fenske, 2015), in turn leading to lower contraceptive use. As Figure A6 shows, the share of polygamous unions among women did not change over time in conflict-affected and less-affected areas, and this result is reflected in regression analyses (not shown). Among men, the share declined at a similar pace between 2006-2018 in conflict-affected and less-affected areas. Regression models show that while the decline was larger in conflict-affected areas, it was not significantly different than from less-affected areas (p-value=0.387). In any case, a decline in polygamy would not be consistent with the hypothesis of changes in marriage structure explaining the decrease in MCU.

[22] Unfortunately, similar questions were not collected in the male questionnaires in 2018.

[23] Alternative reasons for non-using (coded as "0") are (i) non-married, (ii) not having sex (regularly), (iii) respondent/husband/others opposed, (iv) breastfeeding, (v) fatalistic, (vi) interferes with body normal processes, (vii) inconvenient to use, (viii) fear of side effects/health concerns, (ix) religious prohibition. In their "narrow" definition of unmet needs, Senderowicz and Maloney (2022) define these as "demand-side" reasons. Women who did not provide a reason/were unsure are excluded. I obtained identical results when non-use due to religious beliefs, which may have been influenced by the conflict, was coded "1".

Violent conflict, particularly when sustained by reactionary and retrograde ideologies such as the jihadist ones that spread in Mali, may influence gender dynamics to a level that affects women's empowerment in romantic relationships and reproductive self-efficacy, independently of access to contraception. In Cols. 8-12, I examine this hypothesis for both women and men. The only mildly significant relationship is observed with women's ability to refuse to have sex with their partner (Col. 10). The insurrection, instead, does not seem to be linked to any attitudinal change among men.

Alternative specifications and robustness checks

In this section, I examine the sensitivity of the results to (i) alternative measures of conflict exposure, (ii) changes in population composition due to migration, (iii) different sample selection, including couple dyads rather than individuals as the unit of analysis and (iv) across sub-samples. Here, I also report the results of (v) placebo tests of the parallel trend assumption.

Conflict indicators: alternative data, buffers, measurements

To assess the robustness of the conflict exposure measures, I first assess if using ACLED data to construct conflict-events "catchment areas" affects the results. Table A3 shows estimates for the main outcomes when the catchment area radius of each ACLED event is 10 km. Estimates are in line with models using the more conservative UCDP-GED data, but coefficient sizes are generally (and expectedly) smaller.

Second, in Table A4, I test the sensitivity of the results to larger conflict-event buffer zones. Specifically, I increase the catchment area of each UCDP-GED conflict event to 15 and 20 km. By doing so, I progressively include observations located farther away from conflict events. Estimates are again very similar to the main results, though the magnitude of most coefficients decreases with the radius. This agrees with prior evidence suggesting that *local* exposure to violence matters for individual outcomes (Kotsadam and Østby, 2019, Østby et al., 2018, Torrisi, 2023).

Third, I build buffers based on cluster locations (not conflict events). I begin by replacing the binary indicator used so far with a continuous variable counting the number of conflict events within a given distance (10, 15, 20 km) from the respondent's cluster (Table A5).[24] Next, I categorise the variable into "No event", "Low", "Medium" and "High" to evaluate the role of intensity of exposure (Tables A6-A7).

[24] For space reasons, I only show estimates of models using a 10 km buffer from the respondents' location and UCDP-GED data, but results are qualitatively similar with longer radii (15-20 km) and ACLED data. Moreover, the conclusions for all alternative conflict indicators remain unchanged when correcting applying the Romano-Wolf multiple hypothesis correction. Among mechanisms, at high levels of violence, only the variable "woman become promiscuous if using contraception" does not pass the Romano-Wolf correction test (*p-value*=0.178).

Table 2. Influence of conflict exposure on current modern contraceptive use, intention to use in the future and current pregnancy

Panel A: WOMEN

	Any modern method	**Any modern method**	**Injections**	**Pills**	**Implants**	**Condom**	**Condom at last sex**	**Intention to use a modern method**	**(Partner) currently pregnant**	**Current pregnancy unwanted**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.031†	-0.039*	-0.028**	-0.021*	0.012		0.007	0.068**	0.037**	0.115*
	(0.018)	(0.018)	(0.010)	(0.009)	(0.010)		(0.008)	(0.032)	(0.012)	(0.045)
Affected Area	0.060***	0.051***	0.022**	0.019*	0.005		0.008	-0.012	-0.011	-0.069†
	(0.014)	(0.015)	(0.007)	(0.008)	(0.008)		(0.006)	(0.027)	(0.011)	(0.039)
Conflict Period	0.116***	0.113***	0.040***	-0.005	0.074***		-0.014***	0.029	-0.024***	0.007
	(0.010)	(0.009)	(0.005)	(0.004)	(0.006)		(0.002)	(0.019)	(0.007)	(0.025)
FWER *p*-value	0.103	0.049	0.003	0.031	0.244	-	0.415	0.038	0.003	0.021
Observations	17,570	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.101**	-0.076*				-0.053†	-0.070*		0.070*	
	(0.034)	(0.033)				(0.030)	(0.031)		(0.029)	
Affected Area	0.073*	0.022				0.027	0.055*		-0.058*	
	(0.030)	(0.028)				(0.027)	(0.027)		(0.025)	
Conflict Period	0.068***	0.068***				0.001	-0.025**		-0.063***	
	(0.012)	(0.012)				(0.009)	(0.008)		(0.019)	
FWER *p*-value	0.009	0.024				0.079	0.035		0.028	
Observations	4,185	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: Models in Column (1) only control for regional dummies. All other models control for respondent's age, literacy, employment status, ethnicity, religion, region dummies, urban residence, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table 3. Potential mechanisms

Panel A: WOMEN

	Fertility preferences/demand					Knowledge and 'supply-side' issues		Partnership dynamics and attitudes towards contraception				
	Ideal number of children	Desires no more children	Undecided	Wants a(nother) child(ren) within one year	Sexually active	Knows where to get method	Supply-related reasons for non-use	Others decide about woman's health	Can ask partner to use condom	Can refuse sex with partner	Contraception is a woman's business	Woman using contraception is promiscuous
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Conflict Period× Affected Area	-0.229	0.005	0.017	0.087†	-0.004	-0.037*	0.005**	0.011	0.043	-0.052†		
	(0.140)	(0.015)	(0.011)	(0.027)	(0.025)	(0.018)	(0.017)	(0.025)	(0.039)	(0.038)		
Affected Area	-0.065	0.004	-0.015†	-0.034	0.005	0.050***	-0.004***	0.027	-0.039	-0.013		
	(0.122)	(0.011)	(0.009)	(0.022)	(0.023)	(0.015)	(0.019)	(0.021)	(0.031)	(0.036)		
Conflict Period	-0.153†	0.004	0.015**	0.007	0.027*	0.114***	-0.144***	-0.030*	-0.024	0.037*		
	(0.078)	(0.009)	(0.005)	(0.016)	(0.012)	(0.009)	(0.012)	(0.014)	(0.019)	(0.017)		
FWER *p*-value	0.145	0.712	0.135	0.057	0.198	0.011	0.012	0.671	0.257	0.089	-	-
Observations	17,570	17,570	17,570	13,871	15,381	17,552	9,609	15,861	13,329	13,329	-	-

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Conflict Period × Affected Area	-1.722***	0.099**	-0.050*	-0.004	0.076*						0.061	0.023
	(0.494)	(0.037)	(0.022)	(0.061)	(0.038)						(0.051)	(0.049)
Affected Area	1.473**	0.003	0.032	0.031	0.044						-0.079	-0.015
	(0.447)	(0.035)	(0.022)	(0.057)	(0.035)						(0.050)	(0.045)
Conflict Period	1.065***	0.051**	0.029***	0.128***	-0.015						-0.037	0.038
	(0.252)	(0.018)	(0.008)	(0.028)	(0.017)						(0.028)	(0.028)
FWER *p*-value	0.002	0.015	0.047	0.956	0.063	-	-	-	-	-	0.254	0.608
Observations	4,185	4,185	4,185	3,391	4,185	-	-	-	-	-	3,874	3,792

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: All models control for respondent's age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Results from these checks are in line with the main estimations. Importantly though, the intensity of the conflict appears to have some gender-specific implications. While for women the size of the coefficients increases with intensity (with also the use of implants being affected by high-level violence), low/mid-intensity violence seems already sufficient to disrupt men's use of contraception. As to pathways, high-intensity conflict seems to drive reductions in women's capacity to refuse sex, knowledge about where to obtain modern contraception and greater supply-side barriers (Table A7, Panel A). Additionally, disaggregated analyses suggest that violence intensity is associated with (i) a reduction in women's ability to negotiate condom use (Col. 9), (ii) an increase in men's belief that contraception is exclusively a woman's business and (iii) that women who use contraception are promiscuous (Cols. 11-12). Overall, these results seem to indicate that the insurrection – particularly where violence was more intense – undermined women's reproductive autonomy. On the one hand, it directly constrained their bargaining power in their sexual partnerships. On the other hand, it indirectly fostered inequitable and reactionary attitudes towards contraceptive use among men. This may also in part explain why, amid general declines in condom use among men, trends remained stable only in the peaceful South-West, with an increasing share allowing or switching to female-controlled methods (Figure A2).

Selection due to migration

A potential concern with the estimates presented above relates to selection bias due to migratory movements that may have affected the population composition of respondents in the conflict-areas. I assess the extent of this potential bias in two ways. First, I follow Masset (2022) and limit the sample to respondents who reported living in the same location for at least seven years. For respondents surveyed in 2018, this translates to living in the same residence since the insurrection started. Second, I exclude observations from the 2006 M-DHS from areas in eastern Gao and Kidal that had no nearby comparable sampled clusters in 2018. Third, like Ekhator-Mobayode et al. (2021, 2022), I employ a PSM method to match respondents in violent areas before and after conflict onset and estimate Eq. (1) on the common support of the matched samples.

Results from all these checks (Tables A8, A9 and A10) are similar in terms of direction and magnitude to the main models. Although none explicitly solves the selection issue brought in by migration and biases could remain (Daw and Hatfield, 2018, King and Nielsen, 2019), altogether these checks increase confidence in the direction and size of the impact of the insurrection.

Placebo checks

Table 1 and Figure 4 provided suggestive evidence that trends in MCU before the insurrection were similar in conflict-affected and less-affected areas. To explore further evaluate the assumption of parallel trends, I replicate the main analyses on pre-insurrection 2001 and 2006 M-DHS rounds, so that

$ConflictPeriod_t$ takes the value 1 for respondents who were observed in the 2006 wave and 0 for those interviewed in 2001.

Table A11 reports the results of the placebo test: for men-specific outcomes, none of the coefficients of interest $Year\ 2006_t \times AffectedArea_a$ are statistically significant. For women, the coefficient of currently using pills is statistically significant at the 10% level, indicating that for this outcome the relationship observed in the main analyses may be spurious. For all other outcomes, these results provide us with more confidence that being in areas later affected by the insurrection did not imply specific MCU trends that may confound the main results.

Alternative samples and couple-level analyses

I test the sensitivity of the results to alternative samples. In particular, I re-run the analyses on samples that only included women who (i) had not given birth in the last year, (ii) ever had sex, (iii) ever had a partner and (iv) were interviewed between August-November in both surveys. In addition, given the often negative association between IPV and contraceptive use (Maxwell et al., 2015, Svallfors and Billingsley, 2019) and Ekhator-Mobayode et al. (2021)'s finding that the Malian conflict increased women's experiences of physical abuse from partners, I re-run models on the sub-sample of women who were selected for the M-DHS domestic violence modules and reported having experienced at least one form of physical or sexual abuse from their partner in the year preceding each survey. In this sub-sample as well as in the ever-partnered sub-sample, I add partner's literacy level as a control variable. Results for the first four sub-samples are largely analogous to the main specifications (see Table A12, Panels A-D). Similarly, when I restrict the sample to women experiencing IPV, relationships similar to the main models persist for injections and unwanted pregnancy (not shown). This finding may provide additional support to the thesis that the conflict impaired women's reproductive autonomy via disempowerment in the couple, though care must be taken in interpreting the result due to sizable sample reduction (over 70% of cases in the women sample are dropped).

As supplemental sensitivity checks, I introduce time trends in observables characteristics (Table A13) and remove observations from the capital city Bamako, the urban-rural residence covariate or region dummies (Table A14-16). Results are, again, similar to the main models in terms of direction, although the strength and magnitude of the relationships are reduced once observations from Bamako are removed and, for men, when time trends are accounted for.[25]

[25] To further explore whether the insurrection influenced differently MCU in urban and rural communities, I run models where the DID term is interacted with the residence type indicator. Results for any modern method can be visualised in Figure A5. For women, the slowdown appears to be in conflict-affected urban areas, whereas for men MCU decreased both in urban and in rural conflict-affected areas, and slightly more in the latter.

Finally, although the main goal of this study was to examine changes in MCU among all individuals of reproductive age in Mali, regardless of their partnership status and sexual orientation, it is of interest to evaluate whether and how the insurrection may have influenced contraceptive behaviour at the couple-level. Hence, I use data from the M-DHS couple recodes (N=3,813 dyads) and multinomial logistic models to evaluate if the insurrection influenced the probability that (i) both partners are not using any modern method, (ii) only the woman reports using modern methods, (iii) only the man reports using condoms and (iv) both partners report using modern methods.[26] Adjusted estimates show that the insurrection is, again, negatively associated with a decline in women's sole use versus none of the partners using a modern method (RRR=0.512, p-value=0.042). There is no statistical difference in how conflict relates to the probability of men only using condoms and both partners using modern methods (Figure A7). In addition, linear models assessing mechanism at the couple-level showed again that the conflict increased the probability that women reported being unable to ask partners to use condoms (β_3=0.155, p-value=0.004) and moderately decreased ability to refuse sex (β_3= -0.018, p-value=0.073).

Limitations

While findings are robust to checks, across model specifications and data sources, there are some limitations to acknowledge. First, all estimates are based on samples of survivors living in Mali at survey times. That is, what we observe is the relationship between the insurrection and MCU for those who did not die or emigrate from the country. Relatedly, inasmuch as I endeavoured to deal with issues of population composition due to migration, in the absence of full migration histories, these efforts (e.g., matching or sample restrictions) attenuate but cannot eradicate bias. Caution in interpreting the results as strictly causal is thus warranted.

Second, due to the cross-sectional nature of the data, I could not explicitly disentangle if the observed decline in MCU is the result of lower uptake or greater discontinuation, although descriptive evidence from the 2018 M-DHS women's reproductive calendar suggests that post-2012 contraceptive abandonment was significantly higher in the Northern regions (Figure A8). Because of the fewer data collected from men, it was not possible to study in detail factors leading to low current use and any intention to use contraception. Another limitation related to the M-DHS is the potential for reporting bias, especially for sensitive questions such as unwanted pregnancy, use of male-controlled methods and intention to use contraception (Pearson & Becker, 2014). More broadly, although the M-DHS allow

[26] There is abundant literature on potential discrepancy in contraceptive method reporting between spouses in West Africa (e.g., Becker and Costenbader (2001), Pearson and Becker (2014)), which may be related to women's covert use (Choiriyyah & Becker, 2018). In this sub-sample of interest, the level of concordance about the specific method used, if any, was relatively high overall (over 82% of couples reported the same information), but only 11% in the group of couples in which at least one partner reported using a modern method (n=566). Overall, in 10% of couples, the woman reported using some modern method, while the man did not. Couples where the man reported the use of a female controlled method (2%, of which <1% were polygamous), while the female partner did not are coded as a not using.

investigation of various pathways, several other remain unexplored, including poverty and the actual supply/availability of SRH services. Information on reasons for non-use among women suggests that 'supply-side' barriers increased for conflict-affected women, but inevitable sample restrictions may be partially behind the result and due to lack of data, I could not check if women's reasons for non-use matched men's. Exploring gender-specific reasons for non-use and supply-side issues in depth are key avenues for future research (Casey & Tshipamba, 2017).

Third, linking conflict events to survey respondents by a spatial buffer is one of the most advanced techniques to measure conflict exposure at the micro-level when direct information from interviewees is not available (Brück et al., 2016), but this strategy is not bereft of limitations. Conflict events only represent 'extreme' proxies for the real impacts of war on populations, even when they do not result in casualties. There is always a degree of arbitrariness (e.g., in the choice of "catchment" radii, definitional issues of what constitutes a violent event) and potential underreporting, especially in vast countries with remote areas like Mali. Finally, the displacement of the survey cluster locations may affect the accuracy of conflict measures based on georeferencing (Skiles et al., 2013). Nevertheless, the spatial measurements used in this study are more fine-grained and precise in terms of geographical units than the large regional variation employed in prior research (Behrman and Weitzman, 2016, Svallfors and Billingsley, 2019). Results were also robust to the use of different "catchment" areas, alternative conflict indicators and data sources, together increasing confidence in the findings.

Discussion and conclusion

Does armed violence influence the use of modern contraception? This study showed that in Mali the 2012 insurrection was negatively associated with MCU, especially shorter-acting methods. For women, the conflict was also linked to a greater risk of unwanted pregnancy and intention to use modern methods. In light of the aggregate, gender-specific trends in MCU among Malians – i.e., small, but steady increases among women, stable to declining rates among men – these results suggest that conflict violence *slowed down* female MCU that could have been otherwise observed, and mildly *accelerated* a decline in use of condoms at last sex among men, i.e., a barrier method that offers simultaneous protection against unintended pregnancy and STIs.

The result of a negative relationship echoes the findings of most public health research concerned with the consequences of natural hazards on SHR outcomes (Behrman and Weitzman, 2016, Ellington et al., 2013, Hapsari et al., 2009, Kissinger et al., 2007, Leyser-Whalen et al., 2011). Importantly, the estimates are in line with Svallfors and Billingsley (2019)'s finding of contraceptive reduction during the Colombian civil conflict, thereby extending evidence on the detrimental, yet scarcely studied consequences of man-made disasters on reproductive health. More broadly, the results of this study add to knowledge about the population health effects of war (Levy and Sidel, 2016, Murray et al., 2002) and contribute to theory-builidng and expectations about the demographic development of the Sahel-Sahara (Spoorenberg, 2019).

What processes can then explain the negative link between conflict and MCU? My empirical investigation of some of the many potential pathways suggested that armed violence in Mali had a negligible influence on fertility demand, at least for women. However, it negatively influenced women's knowledge about sources of modern methods and increased their likelihood of reporting 'supply-side' barriers as reasons for non-using. This seemingly agrees with Tunçalp et al. (2015) who, using Health Systems Availability Mapping System (HeRAMS) data, found that the availability of SRH services in post-conflict Mali was lowest in conflict areas in the North and Central regions with a high concentration of displaced persons, and with recent findings by Treleaven et al. (2022) showing that, in rural Mali, conflict events within health centres' catchment areas reduced visits to SRH facilities, particularly for childbirth services. It is possible that the combination of lack of knowledge about contraceptive methods, sources of supply and sources of supply because they have become unavailable post-insurrection hindered women's *ability to access* the methods that were more common before the conflict. Similarly, the fact that the insurrection was associated with men's probability of being sexually active and, simultaneously, with a downward shift in their fertility preferences may too be a signal of reduced (condom) access/availability and thus of 'supply-side' unmet need (Senderowicz and Maloney, 2022). Due to lack of data, I could not explicitly test this hypothesis and only speculations can be offered at this point. Irrespective of whether this possibility is correct, this limitation flags up the need for wider data collection efforts, incorporation of and research attention to men's SRH behaviours, rights and needs – together and independently from those of their female counterparts. Since women and men have diverse and unique SRH needs, gender-specific understanding and approaches are required for the development of meaningful SRH interventions and the prevention of other emergencies in humanitarian settings (Hankins et al., 2002, Hawkes and Hart, 2000).

The relevance of examining the responses of women and men separately and jointly is further highlighted by the observation that – where violence was most intense – the insurrection influenced women's reproductive autonomy in two ways: (i) directly, by lowering their ability to negotiate condom use and refuse sex in their partnerships and (ii) indirectly, by fostering men's "ideational" disengagement from SRH and endorsement of stigmatising views of women who use contraception. Since normative attitudes are good predictors of actual behaviour (Ajzen & Fishbein, 1973), there is reason to think that the type of violence that erupted in Mali, with its fundamentalist connotation, may have unleashed or strengthened conservative attitudes towards contraception, making men less likely to feel responsible for family planning and adopting safe sex practices, but also discouraging women from using contraception due to greater fear of social/familial backlash, sanctions and violence. This latter mechanism is likely given that, in Mali, women's reputation and social status are still linked to their ability to conceive and social disapproval constituted a barrier to MCU already before the insurrection (Barden-O'Fallon et al., 2020, Castle, 2003, Castle et al., 1999). Although it is not possible to connect events (conflict, lower MCU and greater undesired pregnancy) in a strictly sequential manner with present data, lower reproductive self-efficacy, ability to use/access contraception and greater traditionalism, altogether, are consistent with the observed post-insurrection increase in current unwanted pregnancy, especially considering Mali's restrictive abortion legislation (allowed only to save the pregnant person's life).

SRH, including family planning and issues of contraception, tends to receive low priority in crisis-affected populations, both in terms of humanitarian intervention and research attention (Kobeissi et al., 2021). This study showed that violence can hinder the use of contraception, for both women and men. Thus, neglecting the role of conflict in Mali and the broader Sahel-Saharan region, where the expansion of MCU and family planning bear much potential for fertility reduction and the fight against STIs (Bongaarts, 2017; Casterline, 2017), can severely limit our understanding of local demographic and population health dynamics. Above and beyond theory, this study highlights the need for developing gender-sensitive interventions that can facilitate immediate SRH service provision for all persons affected by conflict – from young boys to adult women. At the same time, it shows the importance of devoting resources to programs that can respond to the gender-specific changes in normative beliefs and behaviours around contraception that conflict violence can unleash.

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Appendix

Table A1. Samples descriptive statistics

	Women				Men			
	2006	**2018**	**Total**	*p-value*	**2006**	**2018**	**Total**	*p-value*
Outcome variables								
Currently using modern contraception	6.76%	18.04%	11.83%	<0.001	6.32%	11.17%	9.21%	<0.001
Currently using Pills	3.22%	2.29%	2.80%	<0.001	-	-	-	-
Currently using injections	2.64%	6.24%	4.26%	<0.001	-	-	-	-
Currently using implants	0.15%	8.19%	3.76%	<0.001				
Currently using condom	-	-	-	-	6.31%	4.49%	5.23%	0.057
Condom use at last sex[a]	1.92%	1.66%	1.80%	0.363	7.28%	2.35%	4.34%	<0.001
Intends to use contraception in the future (non-users)[b]	36.45%	42.83%	39.12%	0.001	-	-	-	-
(Partner) currently pregnant[c]	13.59%	11.66%	12.74%	<0.001	18.40%	13.28%	15.25%	<0.001
Current pregnancy not wanted[d]	21.33%	17.57%	19.79%	0.074	-	-	-	-
Conflict variables								
Residing within 10km from UCDP conflict event	29.18%	25.57%	27.56%	0.363	20.64%	24.47%	22.93%	0.203
Number of UCDP events within 10km from cluster	2.17 (4.31)	1.91 (3.88)	2.05 (4.89)	0.356	1.61 (3.96)	1.72 (3.66)	1.68 (3.78)	0.676
Number of UCDP events within 10km from cluster				0.332				0.494
No event	70.82%	74.42%	72.43%		79.36%	75.53%	77.07%	
Low (1-5 events)	10.98%	6.67%	9.05%		6.08%	7.92%	7.17%	
Medium (5-9 events)	16.03%	17.38%	16.63%		12.07%	14.80%	13.70%	
High (10+)	2.17%	1.53%	1.88%		2.49%	1.76%	2.06%	
Residing within 10km from ACLED conflict event	37.86%	34.41%	36.31%	0.733	30.15%	33.07%	31.89%	0.440
Number ACLED events within 10km from cluster	10.80 (23.61)	9.05 (19.63)	10.01 (21.96)	0.209	7.67 (21.01)	7.85 (18.58)	7.78 (19.58)	0.874
Number ACLED events within 10km from cluster				0.620				0.787
No event	62.14%	65.60%	63.69%		69.85%	66.93%	68.11%	
Low (1-20 events)	19.89%	16.74%	18.48%		15.87%	18.30%	17.32%	
Medium (20-44 events)	16.09%	16.38%	16.22%		12.93%	13.59%	13.32%	
High (44+)	1.88%	1.28%	1.61%		1.36%	1.19%	1.26%	
Pathways								
Ideal number of children	6.2 (2.64)	5.91 (2.40)	6.11 (2.54)	<0.001	8.64 (4.98)	9.07 (5.47)	8.90 (5.29)	0.093
Does not want more children	17.94%	18.96%	18.40%	0.309	10.39%	17.45%	14.60%	<0.001
Undecided if wants a(nother) child	1.88%	3.57%	2.64%	0.001	3.68%	4.71%	4.29%	0.207
Wants child within a year[e]	38.55%	37.09%	37.90%	0.438	45.33%	57.53%	52.32%	<0.001

Sexually active in the past four weeks				0.322				<0.001
Never had sex	12.93%	11.88%	12.46%					
Active	62.68%	64.39%	63.45%		82.12%	87.53%	85.35%	
Not active	24.39%	23.73%	24.09%		17.88%	12.47%	14.65%	
Someone else usually decides on woman's health care	82.26%	80.54%	81.59%	0.218	-	-	-	
Woman can ask partner to use condom[f]	26.52%	29.44%	27.82%	0.090	-	-	-	
Woman can refuse sex[f]	29.56%	26.61%	28.26%	0.098	-	-	-	
Knows where to get method	6.71%	18.10%	11.83%	<0.001				
Contraception is woman's business	-	-	-		21.48%	20.72%	21.02%	0.747
Woman using contraception is promiscuous	-	-	-		24.07%	26.21%	25.36%	0.366
Socio-demographic controls								
Age at survey time				0.001				0.001
15-19	23.61%	21.51%	22.67%		3.23%	0.38%	1.53%	
20-24	18.89%	18.45%	18.69%		8.44%	4.66%	6.18%	
25-29	18.26%	19.21%	18.69%		14.07%	12.30%	13.01%	
30-34	13.00%	14.94%	13.87%		13.67%	19.55%	17.18%	
35-39	11.61%	12.95%	12.22%		15.45%	19.72%	17.99%	
40-44	8.59%	8.15%	8.39%		14.03%	14.66%	14.41%	
45-49	6.04%	4.77%	5.47%		12.77%	11.31%	11.90%	
50-54	-	-	-		11.12%	10.14%	10.54%	
55-59	-	-	-		7.17%2	7.28%	7.25%	
Place of residence								
Urban	36.40%	28.05%	32.65%	0.008	26.98%	22.72%	24.44%	0.086
Rural	63.60%	71.95%	67.35%		73.02%	77.28%	75.56%	
Region				0.083				0.059
Kayes	12.90%	13.31%	13.08%		15.74%	12.36%	13.73%	
Koulikoro	17.95%	19.56%	18.67%		18.34%	19.37%	18.96%	
Sikasso	16.24%	17.92%	16.99%		18.07%	16.38%	17.06%	
Segou	15.53%	15.57%	15.55%		18.52%	18.07%	18.25%	
Mopti	13.48%	8.93%	11.44%		10.55%	12.13%	11.49%	
Toumbouctou	4.43%	3.37%	3.95%		3.94%	4.20%	4.09%	
Gao	3.52%	2.25%	2.95%		3.00%	2.26%	2.56%	
Kidal	0.46%	0.11%	0.30%		0.57%	0.10%	0.29%	
Bamako	15.50%	18.99%	17.07%		11.27%	15.13%	13.57%	
Religion				0.001				0.004
Islam	91.94%	93.47%	92.63%		93.67%	95.12%	94.54%	
Catholic	3.18%	1.82%	2.57%		3.25%	1.40%	2.15%	
Protestant	1.24%	1.33%	1.28%		2.55%	0.98%	1.62%	

Evangelist	3.63%	0.01%	2.01%		0.52%	0.24%	0.35%	
Other or atheist	0.01%	3.36%	1.52%		0.00%	2.26%	1.35%	
Literacy								
Can (partially) read	19.73%	30.12%	24.40%	<0.001	70.45%	59.53%	63.93%	<0.001
Cannot read	80.27%	69.88%	75.60%		23.47%	4.38%	12.08%	
Currently employed				0.001				<0.001
No	39.00%	45.86%	42.08%		23.47%	4.38%	12.08%	
Yes	61.00%	54.14%	57.92%		76.53%	95.62%	87.92%	
Ethnicity				0.032				0.748
Bambara	30.01%	33.81%	31.71%		31.62%	33.07%	32.48%	
Malinke	8.48%	9.46%	8.92%		9.19%	8.66%	8.87%	
Peulh	14.64%	13.20%	14.00%		15.08%	13.62%	14.21%	
Sarakole/soninke/marka	12.59%	9.26%	11.09%		10.42%	8.48%	9.27%	
Sonrai	8.54%	5.74%	7.28%		4.90%	5.20%	5.08%	
Dogon	5.16%	8.07%	6.47%		6.48%	9.26%	8.14%	
Touareg/Bolla	4.02%	1.77%	3.01%		2.46%	1.71%	2.01%	
Senoufou/Minianka	9.28%	10.14%	9.66%		10.68%	9.57%	10.02%	
Bobo	2.02%	2.25%	2.12%		2.48%	2.60%	2.55%	
Other	5.27%	6.30%	5.73%		6.69%	7.83%	7.37%	
Number of children				0.356				<0.001
0	22.88%	21.81%	22.40%		14.37%	6.81%	9.86%	
1	13.01%	13.36%	13.17%		9.46%	11.86%	10.89%	
2	11.64%	12.54%	12.05%		9.73%	12.46%	11.36%	
3+	52.47%	52.29%	52.39%		66.43%	68.87%	67.89%	
Union type				<0.001				<0.001
Never partnered	14.30%	18.95%	16.39%		-	-	-	
Non-polygamous union	49.49%	49.59%	49.54%		72.23%	79.66%	76.66%	
Polygamous union	32.59%	28.85%	30.91%		27.77%	20.34%	23.34%	
Widowed, separated, divorced	3.62%	2.61%	3.17%		-	-	-	
Observations	9,679	7,891	17,570		1,688	2,497	4,185	

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict indicator. Notes: Observations are weighted using survey weights. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.0011. [a] Asked only to sexually active respondents (2006: N=9,286 women and N=1,688 men; 2018: N=7,318 women and N=2,497 men). [b] Asked only to women who reported no current use of modern contraception (2006: N=8,878; 2018: N=6,385) [c] Here the sample further includes women who reported being currently pregnant (2006: N=1,523; 2018: N=1,041). [d] Asked only to women who reported being currently pregnant (N=1,523 in 2006; N=1,041 in 2018).[e] Asked only to respondents who reported wanting a child (N=7,757 women and N=1,447 men in 2006; N=6,114 women and N=1,944 men in 2018). [f] Asked only to currently partnered women (N=7,396 in 2006; N=5,933 in 2018).

Table A2. Distribution of key observable characteristics by conflict-affectedness

	Women				Men			
	Conflict-affected areas		Less-affected areas		Conflict-affected areas		Less-affected areas	
	2006	2018	2006	2018	2006	2018	2006	2018
Age	26.66	27.64	28.03	28.08	29.59	24.82	27.20	26.47
	(9.09)	(9.24)	(8.87)	(8.50)	(11.06)	(10.87)	(12.32)	(11.90)
Place of residence								
Urban	0.81	0.67	0.17	0.14	0.72	0.60	0.15	0.11
	(0.39)	(0.51)	(0.37)	(0.33)	(0.45)	(0.48)	(0.36)	(0.31)
Religion								
Islam	97.07	98.00	89.95	92.02	96.54	97.95	92.93	94.20
Catholic	2.15	1.03	3.51	1.94	3.33	0.86	3.23	1.57
Protestant	0.20	0.66	1.63	1.52	0	0.52	3.22	1.13
Evangelist	0.58	0	4.89	0.02	0.12	0.21	0.62	0.25
Other or atheist	0	0.31	0.01	4.50	0	0.45	0	2.84
Literacy								
Can (partially) read	0.32	0.47	0.13	0.23	0.49	0.55	0.24	0.35
	(0.48)	(0.55)	(0.33)	(0.41)	(0.51)	(0.49)	(0.43)	(0.47)
Currently employed								
Yes	0.45	0.49	0.67	0.55	0.82	0.93	0.74	0.96
	(0.51)	(0.55)	(0.46)	(0.48)	(0.38)	(0.24)	(0.44)	(0.19)
Ethnicity								
Bambara	23.16	32.54	33.36	33.96	23.49	32.69	33.73	33.19
Malinke	7.42	7.61	8.90	9.88	7.66	6.97	9.59	9.21
Peulh	15.93	13.21	13.80	13.45	15.55	15.47	14.95	13.02
Sarakole/Soninke/ Marka	10.02	9.95	13.66	9.07	8.17	8.47	11.00	8.49
Sonrai	19.02	10.25	4.31	4.32	7.92	8.40	4.12	4.17
Dogon	5.52	9.88	4.81	7.61	8.70	10.32	5.92	8.91
Touareg/Bolla	6.46	1.77	3.01	1.73	4.47	2.62	1.94	1.42
Senoufou/Minianka	3.94	4.48	11.33	11.92	6.05	4.40	11.88	11.24
Bobo	1.31	1.62	2.42	2.35	2.44	1.84	2.48	2.85
Other	7.22	8.69	4.39	5.70	15.55	8.83	4.39	7.51
Number of children	2.59	2.53	3.68	3.43	8.21	7.57	8.76	9.56
	(2.76)	(2.70)	(3.05)	(2.83)	(4.95)	(5.04)	(5.00)	(5.50)
Union type								
Non-polygamous	54.50	52.05	47.43	48.74	81.98	88.82	69.7	76.69
Polygamous union	18.88	17.35	38.23	32.80	18.02	11.18	30.30	23.31
Never partnered	20.84	26.07	11.61	16.20				
Widowed, separated, divorced	5.78	4.53	2.73	1.95				

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict indicator.

Table A3. Conflict indicator built using ACLED data

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.026	-0.011†	-0.029**	0.015		0.009	0.079**	0.036**	0.099*
	(0.016)	(0.008)	(0.009)	(0.010)		(0.007)	(0.031)	(0.011)	(0.043)
Affected Area	0.041***	0.013*	0.017*	0.008		-0.003	-0.028	-0.012	0.014
	(0.012)	(0.007)	(0.007)	(0.006)		(0.005)	(0.024)	(0.010)	(0.034)
Conflict Period	0.102***	-0.007†	0.042***	0.072***		-0.015***	0.019	-0.027***	-0.003
	(0.010)	(0.004)	(0.006)	(0.006)		(0.003)	(0.021)	(0.007)	(0.027)
FWER *p*-value	0.119	0.003	0.071	0.106		0.219	0.014	0.004	0.024
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.063*				-0.043†	-0.053*		0.046†	
	(0.027)				(0.024)	(0.025)		(0.048)	
Affected Area	0.024				0.023	0.046*		-0.050*	
	(0.021)				(0.020)	(0.020)		(0.024)	
Conflict Period	0.070***				0.003	-0.024**		-0.063**	
	(0.013)				(0.010)	(0.009)		(0.020)	
FWER *p*-value	0.030				0.083	0.041		0.120	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. ACLED for conflict event data. Note: All models control for respondent's age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A4. Different buffer radii

Cluster located within 15km from a conflict event

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.034*	-0.026**	-0.020*	0.015		0.005	0.063*	0.039***	0.109*
	(0.017)	(0.009)	(0.008)	(0.010)		(0.007)	(0.031)	(0.012)	(0.043)
Affected Area	0.054***	0.024***	0.014†	0.014*		0.000	0.009	-0.009	-0.040
	(0.013)	(0.007)	(0.007)	(0.006)		(0.005)	(0.028)	(0.011)	(0.034)
Conflict Period	0.113***	0.040***	-0.004	0.072***		-0.014***	0.025	-0.027***	0.001
	(0.019)	(0.006)	(0.004)	(0.006)		(0.002)	(0.020)	(0.007)	(0.027)
FWER *p*-value	0.049	0.006	0.015	0.130		0.517	0.050	0.002	0.026
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.068*				-0.047†	-0.059*		0.045	
	(0.030)				(0.026)	(0.027)		(0.029)	
Affected Area	0.027				0.019	0.035		-0.052†	
	(0.024)				(0.021)	(0.022)		(0.029)	
Conflict Period	0.071***				0.003	-0.024**		-0.060**	
	(0.013)				(0.010)	(0.009)		(0.019)	
FWER *p*-value	0.035				0.091	0.035		0.144	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data. Note: All models control for respondent's age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Cluster located within 20km from a conflict event

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.033**	-0.027**	-0.019*	0.004		0.006	0.045†	0.038***	0.092*
	(0.016)	(0.009)	(0.007)	(0.009)		(0.006)	(0.031)	(0.011)	(0.042)
Affected Area	0.042***	0.013*	0.011	0.015*		0.000	-0.013	-0.026*	-0.014
	(0.011)	(0.006)	(0.006)	(0.006)		(0.005)	(0.027)	(0.011)	(0.033)
Conflict Period	0.119***	0.040***	-0.003	0.075***		-0.015***	0.029	-0.029***	0.000
	(0.010)	(0.006)	(0.004)	(0.006)		(0.003)	(0.022)	(0.007)	(0.029)
FWER *p*-value	0.012	0.001	0.015	0.677		0.340	0.085	0.003	0.043
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.073**				-0.043†	-0.047*		0.040	
	(0.026)				(0.022)	(0.022)		(0.028)	
Affected Area	0.037†				0.022	0.035		-0.029	
	(0.021)				(0.018)	(0.022)		(0.028)	
Conflict Period	0.077***				0.005	-0.024*		-0.062**	
	(0.014)				(0.011)	(0.009)		(0.019)	
FWER *p*-value	0.011				0.067	0.039		0.176	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data. Note: All models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A5. Continuous conflict event indicators

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Number of conflict events within 10km	-0.005**	-0.003***	-0.002**	0.001		0.001	0.004	0.003*	0.007
	(0.002)	(0.001)	(0.001)	(0.001)		(0.001)	(0.003)	(0.001)	(0.005)
Number of conflict events within 10km	0.004**	0.002***	0.001	0.000		0.001*	0.004	-0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.003)	(0.001)	(0.003)
Conflict Period	0.113***	0.039***	-0.006	0.076***		-0.014***	0.040*	-0.019**	0.023
	(0.009)	(0.005)	(0.004)	(0.006)		(0.002)	(0.018)	(0.007)	(0.024)
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

Conflict Period × Conflict events	-0.005				-0.003	-0.006†		0.005†	
	(0.003)				(0.003)	(0.003)		(0.003)	
Conflict events	-0.002				-0.002	0.002		-0.003	
	(0.003)				(0.002)	(0.003)		(0.003)	
Conflict Period	0.058***				-0.005	-0.030***		-0.057**	
	(0.011)				(0.009)	(0.008)		(0.018)	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data. Note: Continuous conflict exposure variable indicating the number of conflict events occurred within 10km from a respondent's cluster location. All other models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001

Table A6. Discrete conflict event indicators: main models

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period ×									
Low (1-4 events)	0.041	0.002	0.015	0.017		0.023**	0.063†	0.040†	0.124*
	(0.032)	(0.021)	(0.015)	(0.016)		(0.008)	(0.041)	(0.023)	(0.062)
Medium (5-9 events)	-0.063**	-0.038***	-0.038***	0.020		-0.004	0.078†	0.043**	0.140*
	(0.021)	(0.010)	(0.011)	(0.013)		(0.012)	(0.041)	(0.013)	(0.062)
High (10+ events)	-0.128**	-0.049*	-0.025*	-0.056***		0.009	-0.097	-0.030	0.052
	(0.039)	(0.018)	(0.023)	(0.010)		(0.022)	(0.061)	(0.041)	(0.076)
Affected area (ref: No conflict events)									
Low (1-4 events)	0.024	0.014*	-0.001	0.012*		-0.008†	-0.044	-0.011	-0.065
	(0.015)	(0.007)	(0.011)	(0.006)		(0.005)	(0.031)	(0.012)	(0.052)
Medium (5-9 events)	0.054*	0.015	0.039***	-0.013		0.033**	0.045	-0.019	-0.124†
	(0.023)	(0.011)	(0.011)	(0.018)		(0.011)	(0.044)	(0.016)	(0.073)
High (10+ events)	0.073*	0.041**	0.006	0.026**		0.007	0.084	0.026	0.022
	(0.036)	(0.014)	(0.023)	(0.009)		(0.009)	(0.056)	(0.034)	(0.049)
Conflict Period	0.113***	0.039***	-0.005	0.074***		-0.013***	0.031	-0.024***	0.007
	(0.009)	(0.005)	(0.004)	(0.006)		(0.002)	(0.019)	(0.007)	(0.025)
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

Conflict Period ×									
Low (1-4 events)	-0.113**				-0.053	-0.029		0.054	
	(0.035)				(0.034)	(0.033)		(0.039)	
Medium (5-9 events)	-0.070†				-0.074	-0.114*		0.100**	
	(0.039)				(0.046)	(0.048)		(0.035)	
High (10+ events)	-0.027†				-0.054†	0.030		0.104†	
	(0.038)				(0.030)	(0.033)		(0.057)	
Affected area (ref: No conflict events)									
Low (1-4 events)	0.056†				0.037	0.029		-0.063*	
	(0.029)				(0.028)	(0.028)		(0.028)	
Medium (5-9 events)	0.032				0.046	0.111*		-0.042	
	(0.058)				(0.054)	(0.048)		(0.038)	
High (10+ events)	-0.064*				-0.087***	-0.061†		0.036	
	(0.030)				(0.026)	(0.032)		(0.048)	
Conflict Period	0.069***				0.001	-0.024**		-0.062**	
	(0.012)				(0.009)	(0.008)		(0.019)	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data. Note: Discrete conflict exposure variable indicating the number of conflict events occurred within 10 km from a respondent's cluster location ranked as “No event”, “Low”, “Medium” and “High”. All other models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A7. Discrete conflict event indicators: pathways

Panel A: WOMEN

	Fertility preferences/demand					Knowledge and 'supply-side' issues		Woman's empowerment				
	Ideal number of children	Desires no more children	Undecided	Wants a(nother) child(ren) within one year	Sexually active	Knows where to get method	Supply-related reasons for non-use	Others take decision about woman's health	Can ask partner to use condom	Can refuse sex with partner	Contraception is woman's business	Woman using contraception is promiscuous
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Conflict Period ×												
Low (1-4 events)	-0.731**	0.054*	0.050*	-0.026	-0.84†	0.041	-0.046	0.001	-0.057	-0.159*		
	(0.287)	(0.023)	(0.020)	(0.044)	(0.047)	(0.032)	(0.031)	(0.044)	(0.057)	(0.082)		
Medium (5-9)	0.099	-0.023	0.001	0.126*	0.046	-0.060**	0.091***	0.018	-0.100*	0.016		
	(0.148)	(0.017)	(0.013)	(0.031)	(0.027)	(0.020)	(0.016)	(0.030)	(0.049)	(0.037)		
High (10+)	-0.825***	0.063†	0.022†	-0.186†	-0.082	-0.128***	0.094***	-0.006	-0.033†	-0.165**		
	(0.224)	(0.035)	(0.011)	(0.095)	(0.052)	(0.040)	(0.028)	(0.057)	(0.053)	(0.092)		
Affected area (ref: No conflict events)												
Low (1-4 events)	0.343	-0.019	-0.031**	0.020	0.049	0.023	0.059†	0.030	0.018	0.021		
	(0.177)	(0.013)	(0.010)	(0.028)	(0.038)	(0.015)	(0.029)	(0.028)	(0.038)	(0.061)		
Medium (5-9)	-0.512**	0.016	-0.004	-0.070*	-0.047†	0.053*	-0.059**	0.030	-0.105†	-0.056		
	(0.169)	(0.017)	(0.014)	(0.030)	(0.027)	(0.023)	(0.020)	(0.041)	(0.055)	(0.042)		
High (10+)	0.011	-0.010	-0.022*	-0.113†	0.075†	0.072†	-0.015	0.027	0.002	0.142***		
	(0.168)	(0.030)	(0.010)	(0.049)	(0.029)	(0.036)	(0.076)	(0.036)	(0.039)	(0.038)		
Conflict Period	-0.167*	0.005	0.015**	0.006	0.026*	0.113***	-0.146***	-0.030*	-0.026	0.0436*		
	(0.078)	(0.008)	(0.005)	(0.016)	(0.012)	(0.009)	(0.013)	(0.013)	(0.019)	(0.017)		
Observations	17,570	17,570	17,570	13,871	15,381	17,552	9,609	15,861	13,329	13,329	-	-

Panel B: MEN

Conflict Period ×											
Low (1-4 events)	-1.327†	0.168*	-0.037	-0.008	-0.020					0.078	0.098
	(0.680)	(0.075)	(0.039)	(0.089)	(0.046)					(0.076)	(0.075)
Medium (5-9)	-1.506*	0.085†	-0.089**	0.044	0.149**					0.006	-0.052
	(0.624)	(0.044)	(0.030)	(0.076)	(0.049)					(0.062)	(0.058)
High (10+)	-4.473***	-0.002	0.107†	-0.295	-0.071					0.342***	0.237*
	(1.177)	(0.041)	(0.063)	(0.186)	(0.107)					(0.093)	(0.105)
Affected area (ref: No conflict events)											
Low (1-4 events)	1.585**	-0.016	0.009	0.032	0.019					-0.050	-0.051
	(0.511)	(0.028)	(0.036)	(0.074)	(0.038)					(0.059)	(0.056)
Medium (5-9)	0.966	-0.037	0.110*	0.028	-0.100†					-0.065	0.060
	(0.793)	(0.066)	(0.050)	(0.083)	(0.053)					(0.075)	(0.066)
High (10+)	2.095†	0.037	-0.098**	0.159	0.059†					-0.360***	-0.258***
	-1,103	(0.036)	(0.033)	(0.134)	(0.034)					(0.076)	(0.047)
Conflict Period	1.073***	0.050**	0.030***	0.131***	0.015					-0.039	0.039
	(0.251)	(0.018)	(0.008)	(0.028)	(0.017)					(0.028)	(0.029)
Observations	4,185	4,185	4,185	3,391	4,185	-	-	-	-	3,874	3,792

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data. Note: Discrete conflict exposure variable indicating the number of conflict events occurred within 10km from a respondent's cluster location ranked as "No event", "Low", "Medium" and "High". All other models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A8. Non-migrant samples

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.038*	-0.030**	-0.022*	0.014		0.010	0.088**	0.037**	0.120**
	(0.019)	(0.010)	(0.010)	(0.011)		(0.009)	(0.033)	(0.013)	(0.046)
Affected Area	0.045**	0.019**	0.021*	0.002		0.005	-0.015	-0.015	-0.078†
	(0.015)	(0.007)	(0.008)	(0.009)		(0.006)	(0.028)	(0.011)	(0.041)
Conflict Period	0.113***	0.040***	-0.006	0.073***		-0.013***	0.011	-0.025***	-0.005
	(0.010)	(0.006)	(0.004)	(0.006)		(0.002)	(0.019)	(0.007)	(0.026)
FWER *p*-value	0.054	0.004	0.044	0.208		0.299	0.017	0.006	0.018
Observations	16,261	16,261	16,261	16,261	-	15,305	14,216	18,595	2,317

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.078*				-0.052†	-0.074*		0.077*	
	(0.033)				(0.030)	(0.031)		(0.030)	
Affected Area	0.027				0.029	0.055*		-0.054*	
	(0.028)				(0.026)	(0.026)		(0.026)	
Conflict Period	0.071***				0.000	-0.023**		-0.070***	
	(0.013)				(0.009)	(0.008)		(0.019)	
FWER *p*-value	0.033				0.107	0.029		0.015	
Observations	3,905	-	-	-	3,905	3,844	-	3,781	-

Sources: 2006 and 2018 M-DHS. The samples only include respondents who have lived for at least 7 years in their current residence location. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. FWER *p*-value is adjusted for multiple testing using the Romano and Wolf (2005, 2016) correction with 1,000 bootstrap replications across all gender-specific outcomes. Unadjusted *p*-values significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A9. Excluding Kidal and Gao clusters

Panel A: WOMEN

	Any modern method	Any modern method (non-migrant sample)	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.041*	-0.040*	-0.028**	-0.025**	0.015		0.006	0.082*	0.037**	0.113*
	(0.019)	(0.020)	(0.010)	(0.010)	(0.011)		(0.008)	(0.033)	(0.012)	(0.046)
Affected Area	0.054***	0.049**	0.022**	0.024*	0.004		0.008	-0.003	-0.012	-0.069†
	(0.016)	(0.016)	(0.008)	(0.009)	(0.009)		(0.006)	(0.028)	(0.011)	(0.040)
Conflict Period	0.115***	0.116***	0.040***	-0.005	0.076***		-0.014***	0.031	-0.024***	0.008
	(0.009)	(0.010)	(0.005)	(0.004)	(0.006)		(0.002)	(0.019)	(0.007)	(0.025)
Observations	16,999	15,709	16,999	16,999	16,999	-	16,473	14,718	19,985	2,530

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.075*	-0.078*				-0.050†	-0.066*		0.069*	
	(0.033)	(0.033)				(0.030)	(0.031)		(0.029)	
Affected Area	0.019	0.024				0.023	0.051†		-0.057*	
	(0.028)	(0.028)				(0.026)	(0.027)		(0.026)	
Conflict Period	0.068***	0.071***				0.001	-0.026**		-0.063***	
	(0.012)	(0.013)				(0.009)	(0.008)		(0.019)	
Observations	4,162	3,882	-	-	-	4,162	4,095	-	4,039	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. The sample excludes observations from the 2006 M-DHS located in eastern Gao and Kidal. Note: models control for respondent's age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A10. Models on the matched sample of the common support

Panel A: WOMEN

	Any modern method	Any modern method (non-migrant sample)	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.029†	-0.028†	-0.023**	-0.025**	0.018†		0.014†	0.054†	0.014	0.100*
	(0.017)	(0.016)	(0.007)	(0.009)	(0.009)		(0.008)	(0.029)	(0.011)	(0.040)
Affected Area	0.025†	0.024†	0.011†	0.014†	-0.000		0.002	-0.007	-0.001	-0.050
	(0.014)	(0.014)	(0.006)	(0.008)	(0.005)		(0.006)	(0.024)	(0.010)	(0.034)
Conflict Period	0.082***	0.084***	0.029***	-0.009†	0.058***		-0.020***	0.027	-0.007	-0.006
	(0.010)	(0.010)	(0.005)	(0.005)	(0.005)		(0.004)	(0.018)	(0.007)	(0.023)
Observations	17,414	16,194	17,414	17,414	17,414	-	16,108	15,035	18,595	2,374

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Conflict Period × Affected Area	-0.075*	-0.076*				-0.048†	-0.051†		0.038	
	(0.029)	(0.030)				(0.027)	(0.027)		(0.025)	
Affected Area	0.021	0.026				0.020	0.028		-0.036	
	(0.025)	(0.025)				(0.023)	(0.024)		(0.023)	
Conflict Period	0.056***	0.059***				-0.016	-0.053***		-0.067***	
	(0.016)	(0.017)				(0.014)	(0.013)		(0.017)	
Observations	4,177	3,934	-	-	-	4,177	4,108	-	4,054	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Variables used to estimate the kernel propensity scores (age, literacy, religion and employment status) are dropped. Other controls include ethnicity, urban residence, region dummies, number of children ever born and union type. The kernel density function is Epanechnikov with a bandwidth of 0.06. Probit estimation is used for the propensity score in the first stage. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A11. Placebo analyses

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year 2006 × Affected Area	-0.025	-0.003	-0.019†	0.002		-0.003	-0.042	-0.005	-0.079
	(0.014)	(0.007)	(0.011)	(0.001)		(0.007)	(0.030)	(0.011)	(0.050)
Affected Area	0.027*	0.003	0.023*	-0.002		0.002	0.043	-0.002	0.031
	(0.013)	(0.005)	(0.011)	(0.001)		(0.005)	(0.026)	(0.011)	(0.041)
Year 2006	-0.002	-0.000	-0.000	-0.000		0.007**	-0.044*	0.003	0.095***
	(0.005)	(0.004)	(0.003)	(0.001)		(0.002)	(0.018)	(0.008)	(0.024)
Observations	17,530	17,530	17,530	17,530	-	16,937	15,976	20,204	2,644

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year 2006 × Affected Area	-0.018				-0.026	0.009		-0.040	
	(0.034)				(0.033)	(0.032)		(0.028)	
Affected Area	0.029				0.032	0.007		-0.008	
	(0.024)				(0.025)	(0.019)		(0.021)	
Year 2006	-0.045***				-0.021†	0.013		0.018	
	(0.012)				(0.012)	(0.011)		(0.018)	
Observations	2,686	-	-	-	2,686	2,151	-	2,082	-

Sources: 2001 and 2006 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: Models control for respondents' age, literacy, employment status, ethnicity, religion, region dummies, urban residence, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A12. Alternative samples

Panel A: Women who did not have a birth in the last 12-months

	Any modern method	Injections	Pills	Implants	Condom at last sex	Intention to use a modern method	Currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conflict Period × Affected Area	-0.047*	-0.029**	-0.025*	0.010	0.008	0.072*	0.047**	0.105*
	(0.020)	(0.010)	(0.010)	(0.012)	(0.010)	(0.033)	(0.015)	(0.045)
Affected Area	0.052**	0.018*	0.021*	0.005	0.009	-0.015	-0.019	-0.069†
	(0.017)	(0.008)	(0.010)	(0.009)	(0.007)	(0.027)	(0.014)	(0.040)
Conflict Period	0.112***	0.040***	-0.007†	0.084***	-0.016***	0.014	-0.030***	0.010
	(0.011)	(0.006)	(0.004)	(0.006)	(0.003)	(0.019)	(0.009)	(0.025)
Observations	13,097	13,097	13,097	13,097	12,282	11,240	15,581	2,469

Panel B: Women who ever had sex

	Any modern method	Injections	Pills	Implants	Condom at last sex	Intention to use a modern method	Currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conflict Period × Affected Area	-0.040*	-0.031**	-0.027**	0.020	0.007	0.051	0.038**	0.115*
	(0.021)	(0.011)	(0.011)	(0.014)	(0.008)	(0.034)	(0.014)	(0.045)
Affected Area	0.060***	0.025**	0.025**	0.003	0.008	-0.010	-0.010	-0.069†
	(0.016)	(0.006)	(0.010)	(0.009)	(0.006)	(0.027)	(0.012)	(0.040)
Conflict Period	0.118***	0.043***	-0.006	0.078***	-0.014***	0.031	-0.027***	0.008
	(0.009)	(0.006)	(0.004)	(0.006)	(0.002)	(0.020)	(0.008)	(0.025)
Observations	15,381	15,381	15,381	15,381	16,605	13,075	17,945	2,547

Panel C: Ever-partnered women

	Any modern method	Injections	Pills	Implants	Condom at last sex	Intention to use a modern method	Currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conflict Period × Affected Area	-0.028†	-0.027*	-0.022*	0.018	-0.007	0.044	0.038*	0.126**
	(0.022)	(0.012)	(0.011)	(0.012)	(0.006)	(0.036)	(0.015)	(0.045)
Affected Area	0.048**	0.021	0.020*	0.008	0.008	-0.013	-0.007	-0.066†
	(0.017)	(0.008)	(0.010)	(0.009)	(0.005)	(0.029)	(0.013)	(0.039)
Conflict Period	0.115***	0.042***	-0.007*	0.075***	-0.010***	0.031	-0.027***	0.008
	(0.010)	(0.006)	(0.004)	(0.006)	(0.002)	(0.020)	(0.008)	(0.026)
Observations	14,690	14,690	14,690	14,690	15,389	12,612	16,436	2,423

Panel D: Women interviewed August-November

	Any modern method	Injections	Pills	Implants	Condom at last sex	Intention to use a modern method	Currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Conflict Period × Affected Area	-0.053**	-0.028**	-0.032**	0.012	0.010	0.081*	0.038*	0.044
	(0.020)	(0.011)	(0.011)	(0.011)	(0.009)	(0.042)	(0.015)	(0.059)
Affected Area	0.080***	0.028**	0.037***	0.005	0.010	-0.010	-0.017	-0.020
	(0.019)	(0.010)	(0.010)	(0.009)	(0.008)	(0.038)	(0.015)	(0.057)
Conflict Period	0.117***	0.035***	-0.001	0.076***	-0.008**	0.020	-0.027**	0.000
	(0.010)	(0.005)	(0.004)	(0.006)	(0.002)	(0.022)	(0.009)	(0.029)
Observations	12,423	12,423	12,423	12,423	11,664	10,530	14,170	1,736

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: In Panels A-B and D, models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, region dummies, number of children ever born and union type. In Panel C, models also control for partner's education. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A13. Adding time trends in observables

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	0.023†	-0.001*	-0.002*	0.021		0.019*	0.012*	-0.001	0.085*
	(0.027)	(0.015)	(0.010)	(0.016)		(0.009)	(0.042)	(0.019)	(0.062)
Affected Area	0.015	0.005	0.007	0.001		0.002	0.015	0.008	-0.060
	(0.013)	(0.006)	(0.010)	(0.001)		-0.006	(0.033)	(0.012)	(0.052)
Conflict Period	-0.045	-0.024	-0.022	0.008		-0.040*	0.030	0.012	-0.094
	(0.043)	(0.022)	(0.016)	(0.030)		(0.016)	(0.080)	(0.033)	(0.089)
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.086*				-0.049	-0.013		0.031	
	(0.034)				(0.031)	(0.028)		(0.031)	
Affected Area	0.031				0.025	0.013		-0.029	
	(0.027)				(0.025)	(0.023)		(0.027)	
Conflict Period	-0.154*				-0.136**	-0.222***		0.148†	
	(0.064)				(0.051)	(0.053)		(0.080)	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: All models include interactions between the time indicator and the controls. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A14. Excluding Bamako

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to a use modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.006†	-0.006*	-0.007	0.013		0.010	0.083†	0.030	0.109*
	(0.031)	(0.017)	(0.013)	(0.015)		(0.007)	(0.045)	(0.019)	(0.053)
Affected Area	0.038*	0.008	0.016	0.009*		0.000	-0.078	-0.002	-0.047
	(0.017)	(0.006)	(0.010)	(0.002)		(0.005)	(0.032)	(0.012)	(0.045)
Conflict Period	0.112***	0.040***	-0.003	0.072***		-0.011***	0.014	-0.026***	0.006
	(0.100)	(0.005)	(0.003)	(0.005)		(0.002)	(0.020)	(0.007)	(0.026)
Observations	14,571	14,571	14,571	14,571	-	14,198	12,856	16,841	2,252

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.086**				-0.024	-0.012†		0.028	
	(0.030)				(0.028)	(0.028)		(0.036)	
Affected Area	0.024				0.001	0.010		-0.034	
	(0.026)				(0.024)	(0.026)		(0.029)	
Conflict Period	0.070***				-0.013	-0.023**		-0.062**	
	(0.012)				(0.010)	(0.010)		(0.019)	
Observations	3,617	-	-	-	3,617	3,553	-	3,498	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: Models control for respondents' age, literacy, employment status, ethnicity, urban residence, religion, region dummies, number of children ever born and union type. The sample excludes observations from Bamako. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A15. No urban/rural variable control

Panel A: WOMEN

	Any modern method	**Injections**	**Pills**	**Implants**	**Condom**	**Condom at last sex**	**Intention to a use modern method**	**(Partner) currently pregnant**	**Current pregnancy unwanted**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.045**	-0.029**	-0.026**	0.011		0.008	0.061†	0.039**	0.117**
	(0.018)	(0.010)	(0.009)	(0.011)		(0.008)	(0.033)	(0.012)	(0.045)
Affected Area	0.065***	0.023***	0.029***	0.007		0.007	0.006	-0.015	-0.074†
	(0.013)	(0.007)	(0.008)	(0.006)		(0.006)	(0.026)	(0.010)	(0.039)
Conflict Period	0.110***	0.039***	-0.009*	0.073***		-0.014***	0.025	-0.022**	0.010
	(0.009)	(0.005)	(0.003)	(0.006)		(0.002)	(0.019)	(0.007)	(0.025)
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.079*				-0.055†	-0.072*		0.070*	
	(0.033)				(0.031)	(0.031)		(0.029)	
Affected Area	0.039				0.043	0.056*		-0.062*	
	(0.028)				(0.026)	(0.027)		(0.026)	
Conflict Period	0.057***				-0.009	-0.032		-0.061***	
	(0.012)				(0.010)	(0.008)		(0.019)	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: Models control for respondents' age, literacy, employment status, ethnicity, religion, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001.

Table A16. No region dummies

Panel A: WOMEN

	Any modern method	Injections	Pills	Implants	Condom	Condom at last sex	Intention to use a modern method	(Partner) currently pregnant	Current pregnancy unwanted
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.031†	-0.025*	-0.017†	0.011		0.009	0.090**	0.034**	0.116*
	(0.020)	(0.010)	(0.010)	(0.010)		(0.009)	(0.034)	(0.012)	(0.045)
Affected Area	0.027*	0.014*	0.009	0.001		0.011†	-0.061*	-0.017†	-0.078*
	(0.014)	(0.006)	(0.008)	(0.005)		-0.006	(0.025)	(0.010)	(0.037)
Conflict Period	0.113***	0.039***	-0.006	0.075***		-0.014***	0.033†	-0.024***	0.010
	(0.009)	(0.005)	(0.003)	(0.006)		(0.002)	(0.019)	(0.007)	(0.025)
Observations	17,570	17,570	17,570	17,570	-	16,604	15,262	20,134	2,564

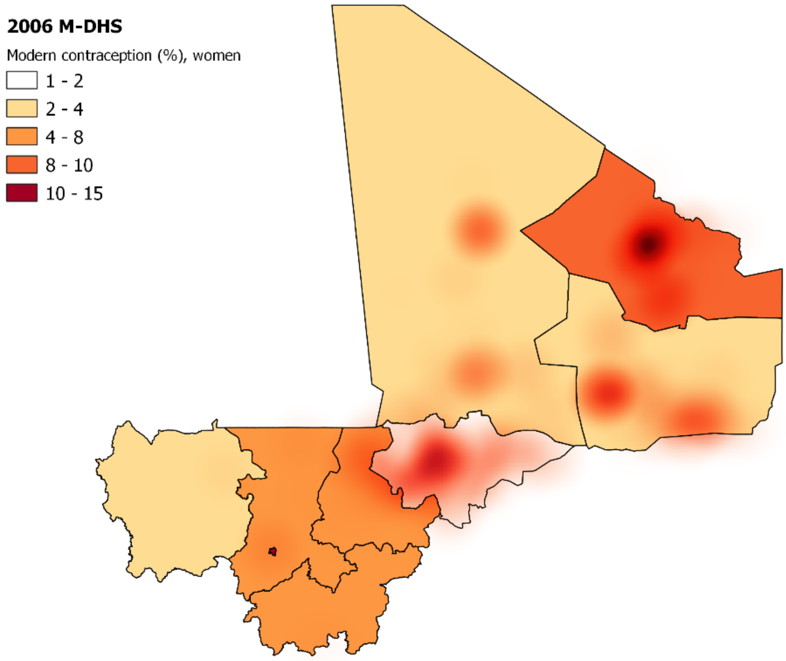
Panel B: MEN

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Conflict Period × Affected Area	-0.091**				-0.052†	-0.070*		0.071*	
	(0.034)				(0.030)	(0.031)		(0.029)	
Affected Area	0.004				0.015	0.050†		-0.087***	
	(0.028)				(0.027)	(0.028)		(0.024)	
Conflict Period	0.068***				0.000	-0.025**		-0.063***	
	(0.012)				(0.009)	(0.008)		(0.019)	
Observations	4,185	-	-	-	4,185	4,118	-	4,061	-

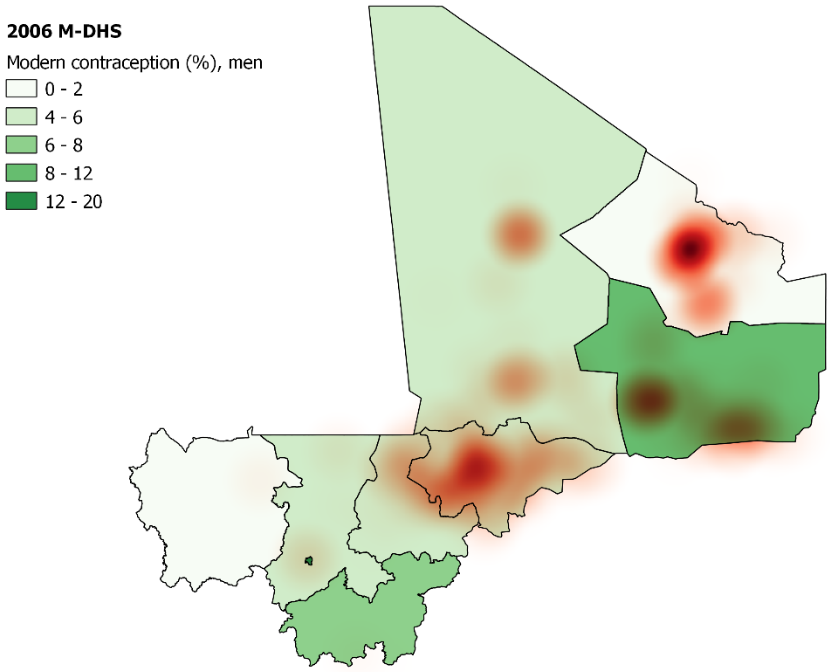
Sources: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator. Note: Models control for respondents' age, literacy, employment status, ethnicity, religion, urban residence, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors in parentheses are clustered at the primary sampling unit level. Significant at †p<0.10; *p<0.05; **p<0.01; ***p<0.001

Figure A1. Geography of conflict violence and pre-conflict contraceptive use among women (Panel A) and men (Panel B)

Panel A: Women



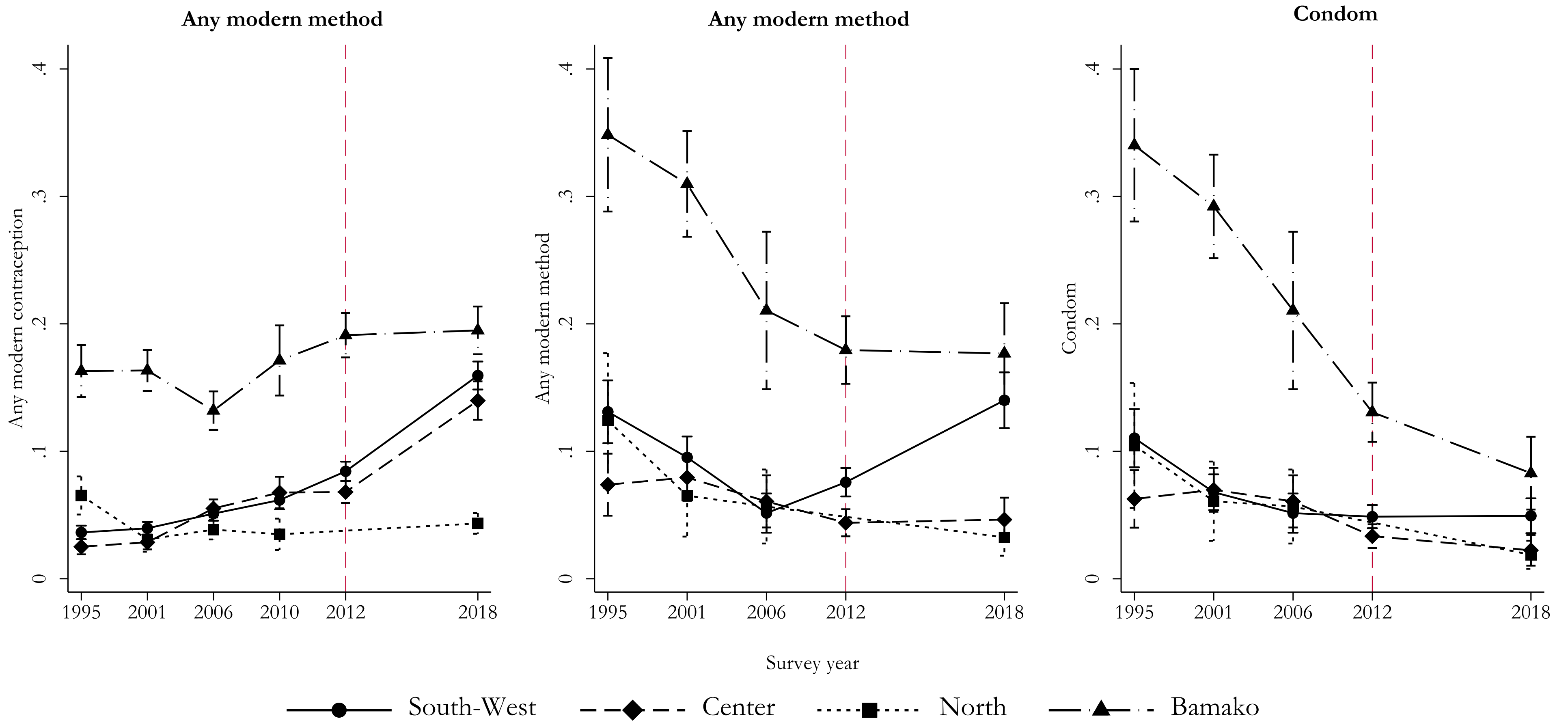
Panel B: Men



Source: Author's calculation using the 2006 M-DHS; UCDP-GED (2023) for conflict data. Notes: Colour intensity of the circles is weighted by the number of reported fatalities caused by each conflict event. UCDP-GED casualties according to the source "best-estimate" value.

Figure A2. Trends in modern contraceptive use by macro regions, 1995-2018

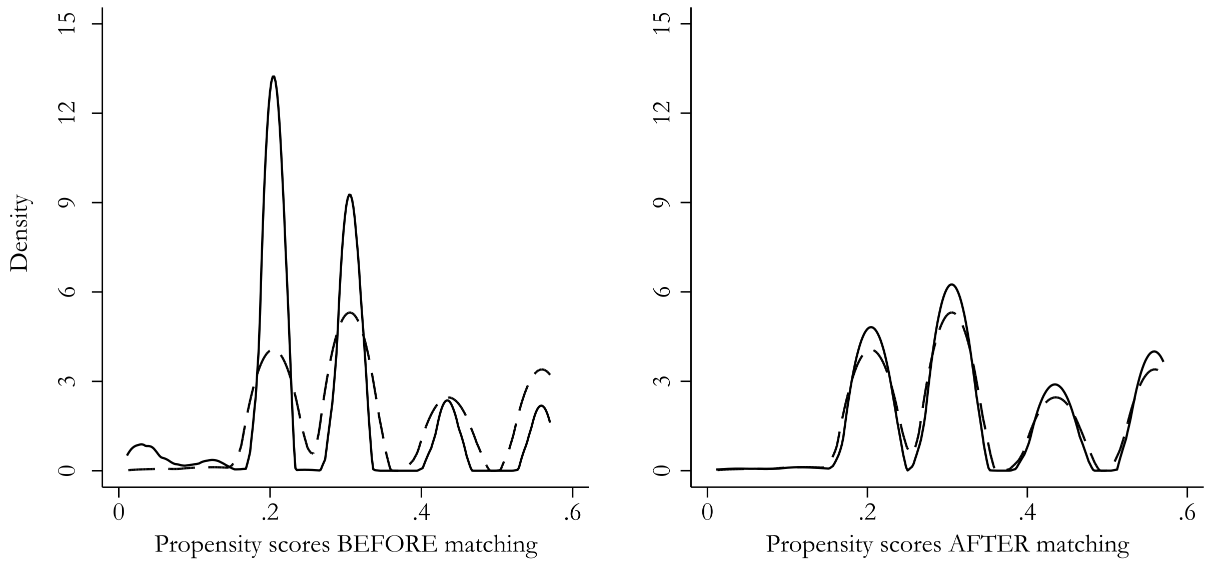
Panel A: Women **Panel B: Men**



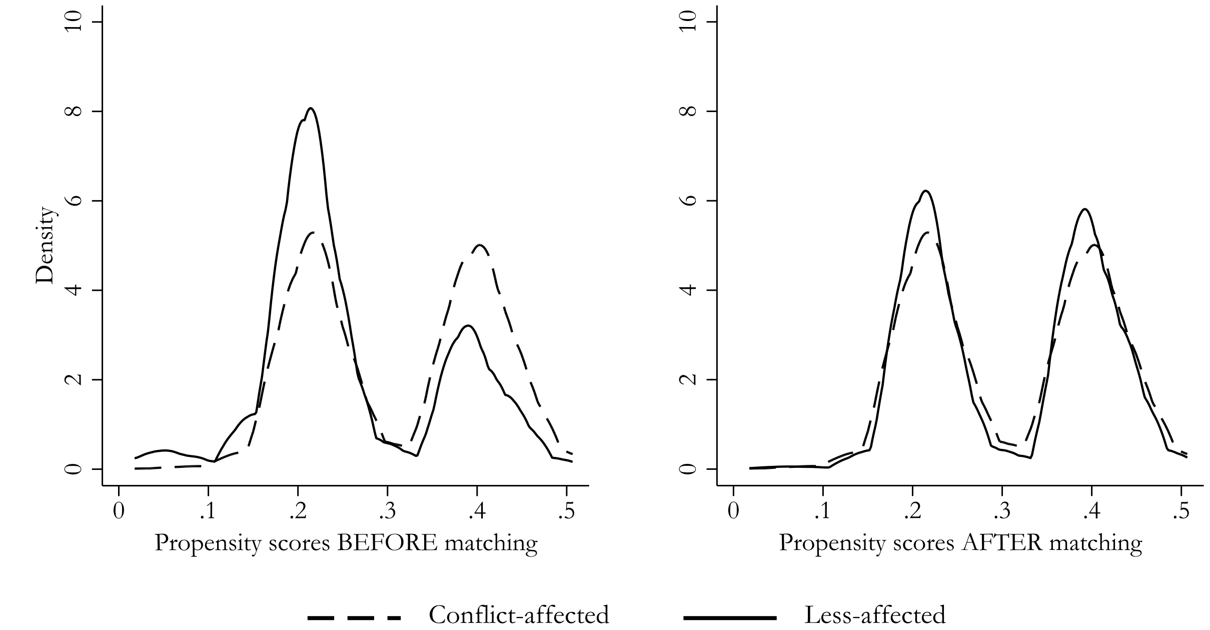
Source: 1995-96, 2001, 2006, 2012, 2018 M-DHS. 2010 MICS for women sample. Notes: Trends in women's (Panel A) and men's (Panel B) current use of modern contraception by macro-regions. South-West includes Kayes, Koulikoro and Sikasso. Centre includes the regions of Mopti and Segou. North includes the regions of Gao, Kidal, and Toumbouctou. Note that Kidal was not surveyed in the 1995-96 M-DHS and the whole Northern territories (Gao, Kidal, Toumbouctou) were not surveyed in the 2012 M-DHS.

Figure A3. Kernel density graph before and after matching

Panel A: Women



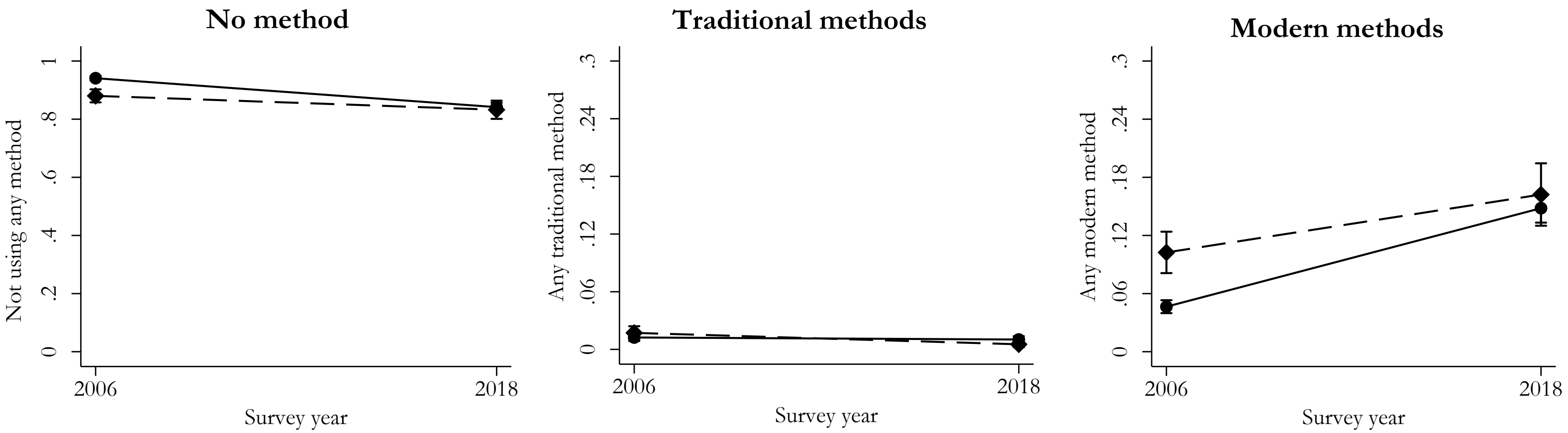
Panel B: Men



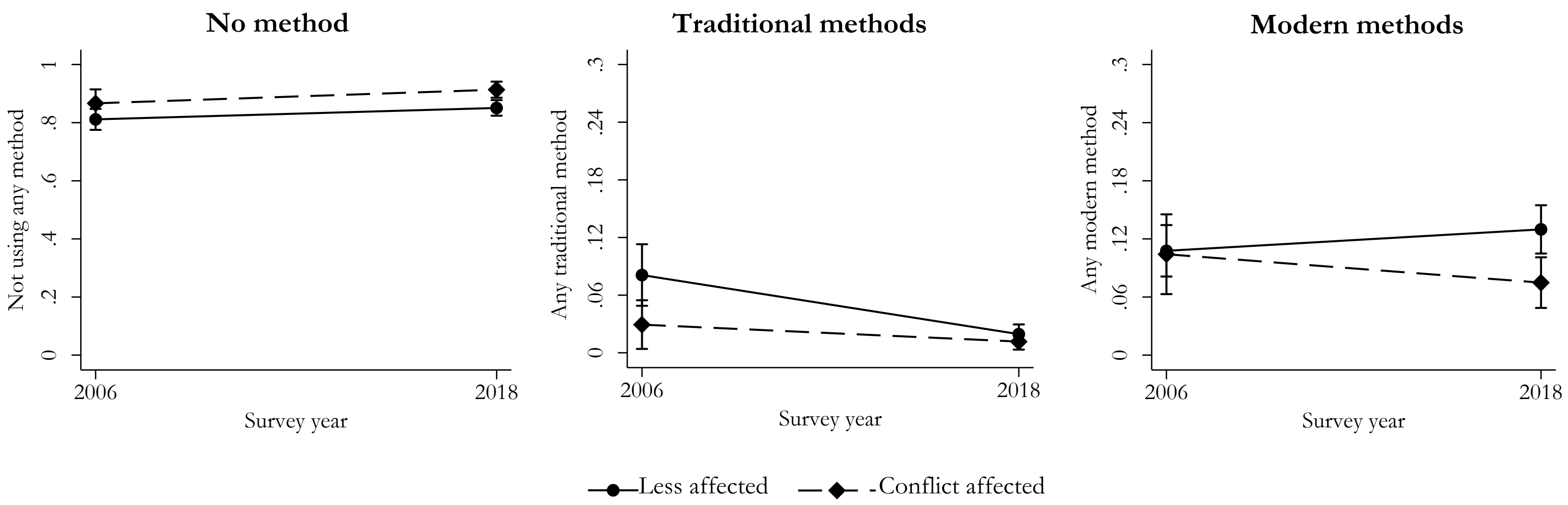
Source: 2006 and 2018 M-DHS. Notes: Kernel density functions of the propensity scores before and after matching. Respondents are matched on age, education, religion and employment status.

Figure A4. Multinomial logistic models

Panel A: Women

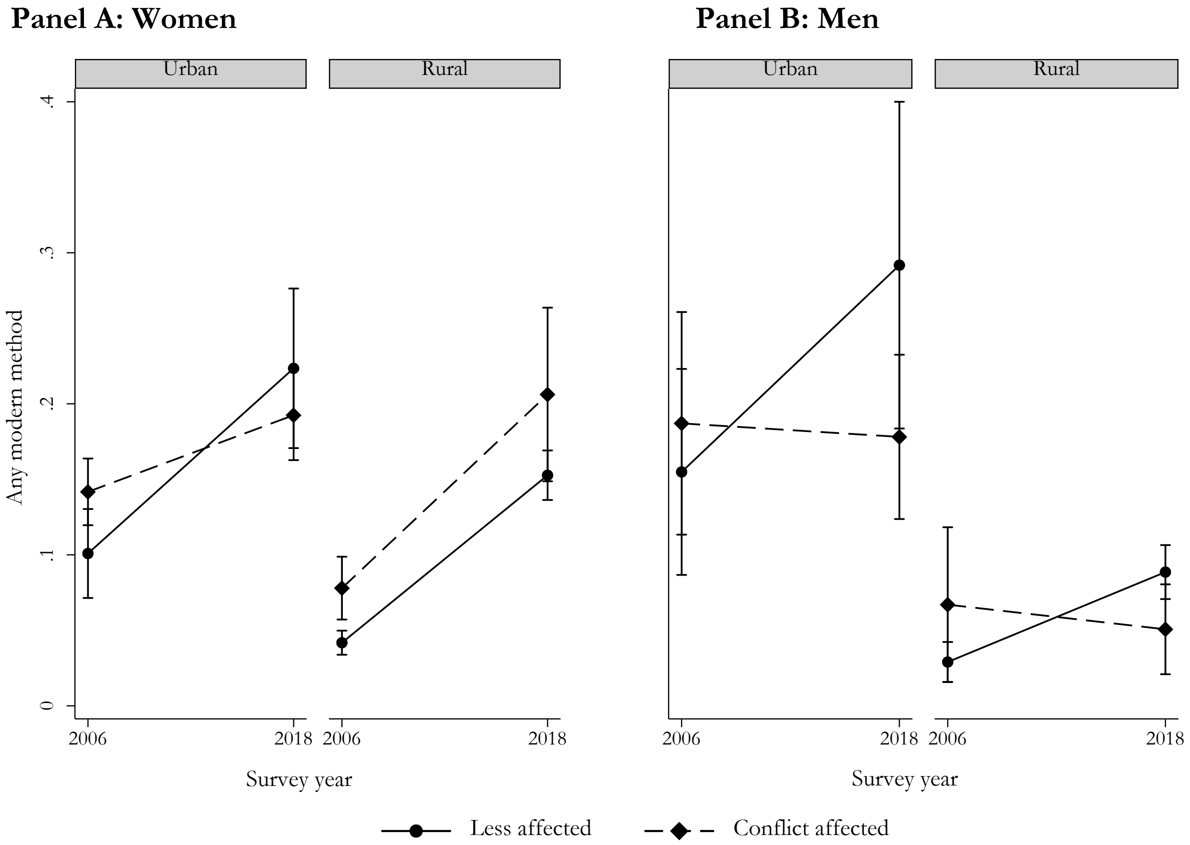


Panel B: Men



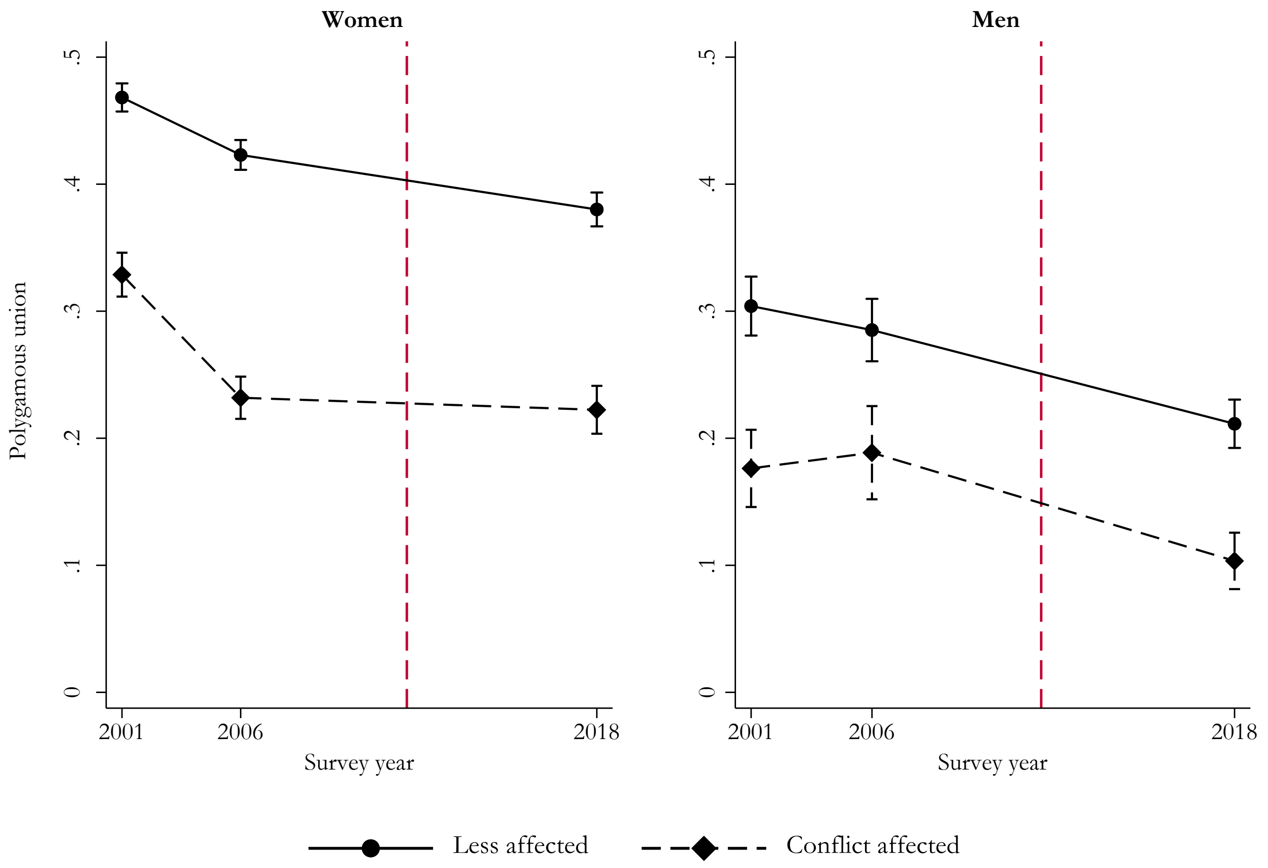
Source: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator (10 km buffer). Notes: Predicted probabilities from multinomial logistic models. Models control for respondent's age, literacy, employment status, ethnicity, religion, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors clustered at the primary sampling unit level.

Figure A5. Triple interaction with urban/rural residence



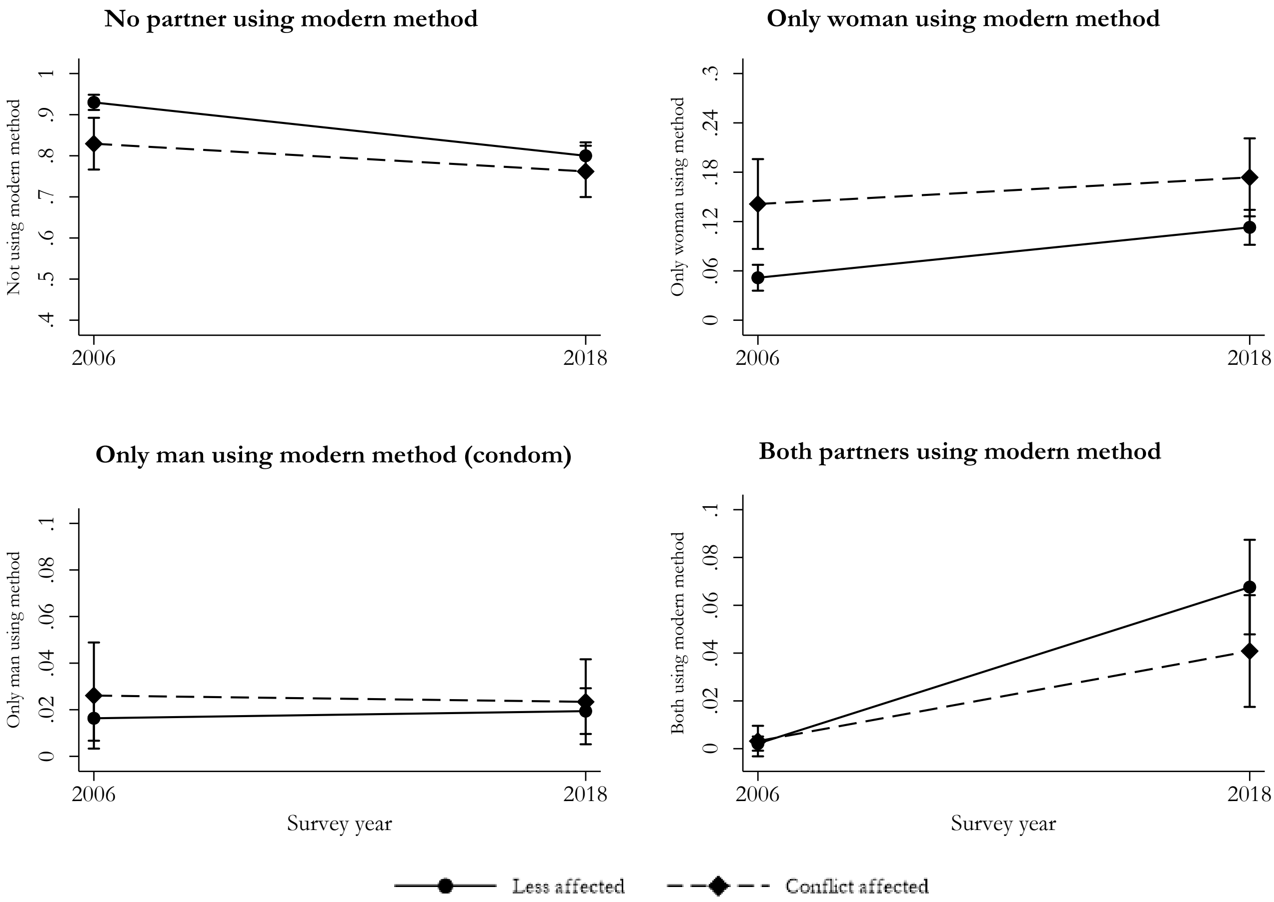
Source: 2006 and 2018 M-DHS. UCDP-GED for conflict event data used to build the binary conflict exposure indicator (10 km buffer). Notes: Predicted probabilities from models including an interaction of DID term with the urban variable. Models control for respondent's age, literacy, employment status, ethnicity, religion, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors clustered at the primary sampling unit level.

Figure A6. Trends in polygamous unions (partnered respondents)



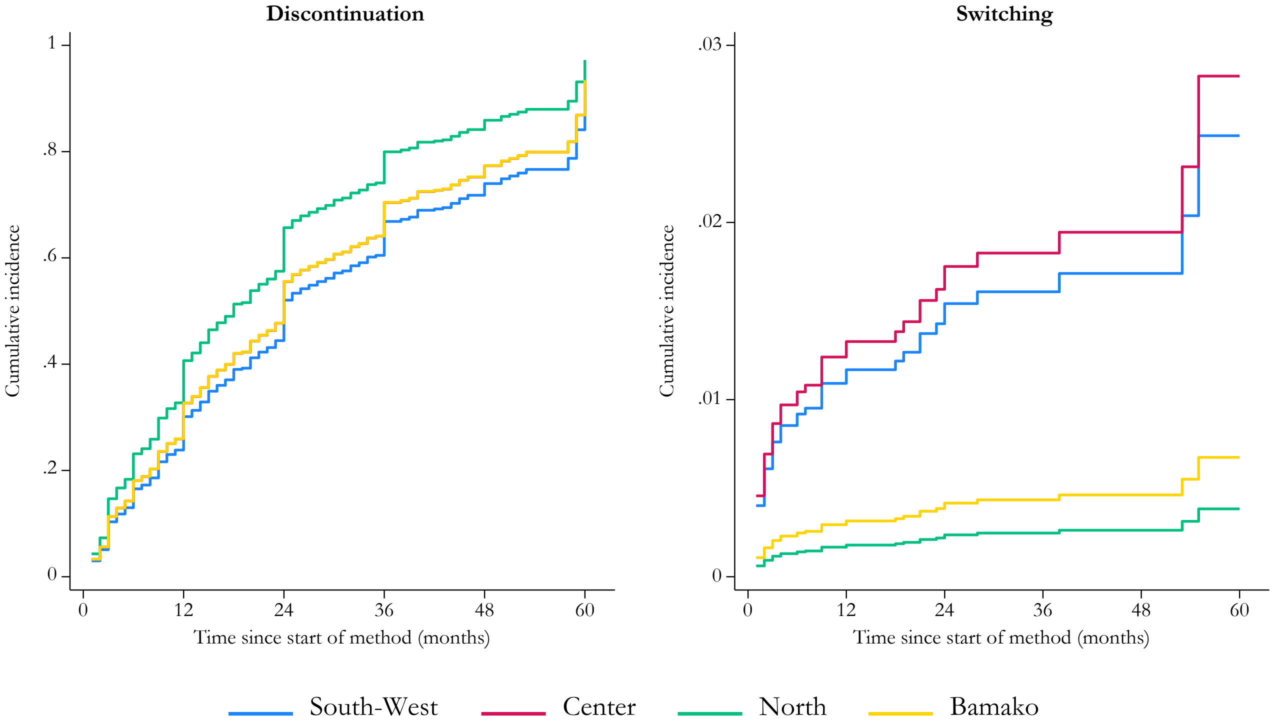
Source: 2001, 2006, 2018 M-DHS (partnered respondents). The dashed line represents conflict-affected areas, using UCDP-GED 10 km buffer. The solid line represents less affected areas.

Figure A7. Multinomial logistic models – couple recode (n= 3,813 dyads)



Source: 2006 and 2018 M-DHS couple recode files. UCDP-GED for conflict event data used to build the binary conflict exposure indicator (10 km buffer). Notes: Predicted probabilities from multinomial logistic models (no partner reports using, only woman reports using, only man reports using condoms, both partners report using a modern method). Models control for woman and man's age, literacy, ethnicity, religion, region dummies, number of children ever born and union type. Estimates are weighted using survey weights. Robust standard errors clustered at the primary sampling unit level.

Figure A8. Cumulative incidence of contraceptive discontinuation and switching in the five years prior to the 2018 M-DHS



Source: 2018 M-DHS reproductive calendar data recording monthly contraceptive/pregnancy status and reasons for discontinuing contraceptive methods for the five calendar years before the survey (i.e., the period starting January 2013). The same data is not available in the 2006 M-DHS. Notes: Cumulative incidence calculated using a "competing risk" framework and two types of discontinuation (Steele and Curtis, 2003): (i) contraceptive abandonment, when women report stopping the use of a method for a month or more without resuming any and (ii) switching, when women report adopting a different method from the previous one within a month of interruption. Only few episodes of switching (<3% of all 2,621 episodes) were recorded in the calendar, so the right-side panel should be interpreted with care. Estimates are similar with simpler Cox survival regression models.