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A Peace Baby Boom? Evidence from Colombia's Peace Agreement*

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Abstract

Violent environments affect household fertility choices, demand for health services and health outcomes of newborns. Using administrative data from Colombia and a *difference-in-differences* strategy, we study how the end of the 5-decade long conflict with the FARC insurgency affected fertility outcomes in areas traditionally affected by FARC's violence relative to the rest of the country. We find that, after the start of a permanent ceasefire in December 2014, Colombia's secular reduction of the total fertility rate slowed down in treated municipalities. In particular, the aggregate fertility rate differentially *increased* in these areas by 2.6 per cent. The differential increase in fertility rates is larger in municipalities with higher levels of landmine victims and expelled internally displaced people at baseline, and it is not driven by the behaviour of any particular age-specific fertility rate. We interpret this evidence as consistent with an increased optimism to raise children in a better environment.

JEL Codes: I12; I15
Keywords: fertility; pregnancy; mortality; armed conflict; violence

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1 Introduction

Crime and violence impose a magnificent economic and social burden. They introduce uncertainty, drive away investment, hinder human and social capital accumulation, and generate fear and anxiety among many other perverse effects. This is especially worrisome in Latin America and the Caribbean, which account for less than 10 per cent of the world's population but over a third of the global homicide rate. According to the newspaper *USA Today*, 42 of the 50 most violent cities of the world are located in that region.[1]

Violent environments also shape households' long-term choices. Fertility decisions are a key example (Brück and Schindler, 2009): in contexts of the high perceived risk of mortality and disability and where the supply of health care services is disrupted, households may be unwilling to commit to long-term decisions such as fertility. This is particularly the case of intergenerationally altruistic parents, who incorporate the welfare of future generations into their choices (Birchenall and Soares, 2009). In turn, events that mark the end of long periods of violence may be followed by increases in fertility rates. Perhaps the most prominent historical example of the positive relationship between peace and fertility is the post World War II *baby boom*.[2]

Using detailed administrative data from vital statistics as well as the records from all individuals' interactions with the health system, this paper documents a differential increase in fertility rates in municipalities formerly exposed to the *Revolutionary Armed Forces of Colombia* (FARC from its Spanish acronym) after violence perpetrated by this insurgency ended in the context of recent peace negotiations with the Colombian government. We do so using a *difference-in-differences* empirical strategy that compares the evolution of fertility in areas traditionally more affected by FARC's violence to that in less violent areas. We find that, after the start of a permanent ceasefire declared in December 2014, Colombia's secular reduction of the total fertility rate slowed down in places that previously experienced more FARC violence. This translates into differential fertility *increase*. This means that Colombia's post ceasefire *baby boom* is more nuanced than the historical instances of absolute fertility increases experienced in other contexts..

In particular, we estimate that a one-standard-deviation increase in the number of FARC attacks per 10,000 inhabitants over the period 2011-2014 caused a statistically significant differential *in-*

[1]See https://www.usatoday.com/picture-gallery/travel/news/2019/07/24/most-dangerous-cities-world-tijuana-caracas-cape-town/1813211001/ (last accessed May 19, 2021).

[2]In general, episodes of fertility declines that are followed by re-bounces have also been documented for natural disasters (Nobles et al., 2015; Finlay, 2009; Caldwell, 2006). This suggests that this pattern is not unique to events of large drops in violence but more generally to the end of high mortality events.

creases of 2.6 per cent in the total fertility rate after the start of the ceasefire.[3]

These results are robust to including municipality and department-year fixed effects, that flexibly control for any municipal-specific time-invariant heterogeneity and for any temporal shock that affects fertility rates of all the municipalities of a given department, respectively. The results are also largely unchanged when we control for a large set of pre-ceasefire municipal characteristics interacted with year fixed effects, therefore accounting for differential changes across municipalities with different values of such attributes. Moreover, the validity of our estimates and the extent to which they can be interpreted as causal depend on the assumption that, absent the ceasefire, the fertility rate would have followed the same trend in municipalities highly exposed to FARC violence and control areas. We find evidence that is consistent with this assumption using both parametric and non-parametric techniques. In particular, we document that, prior to the ceasefire, the fertility rate did not feature any significant differential trend in places highly affected by FARC violence.

We also investigate the mechanisms associated with the differential increase in fertility rates following the ceasefire and find robust suggestive evidence consistent with a generalised feeling of improved security and optimism driving fertility choices in former FARC exposed municipalities. For instance, we find that the differential increase in fertility rates is larger in places that witnessed more land mines explosions and expelled more internal refugees prior to the start of the ceasefire. This is consistent with the proposed mechanisms to the extent that the post-conflict perception of safety is larger in areas that experienced worse violence. Also, we document elsewhere that the ceasefire generated a large differential improvement in a number of educational outcomes in areas traditionally exposed to FARC violence (Prem et al., 2021).

In turn, in the context of the end of a low-intensity conflict, fought for a very long period and in specific peripheral regions with low state presence, we find no support for a number of alternative (and more traditional) mechanisms related to the economic rebound experienced after short but intense episodes of violence or natural disasters. First, previous literature has shown that parents may be inclined to replace the children lost during conflict (Schindler and Bruck, 2011; Rutayisire, 2014; Kraehnert et al., 2018; Heuveline and Poch, 2007). However, we find no significant heterogeneous effects in municipalities with higher levels of infant mortality prior to the start of the ceasefire.

[3] After the ceasefire, FARC's offensive activity dropped by 98 per cent (CERAC, 2016), and the cases of land mines explosion dropped by 76 per cent. Indeed, by declaring a ceasefire, FARC signalled its unified command structure and its commitment to reaching a peace agreement by refraining from initiating attacks or responding violently to actions perpetrated either by the military or other armed groups.

Second, conflict termination could restore the functioning of marriage markets that violence disrupted. Indeed, it has been shown that violence generates a shortage of eligible men (De Walque, 2006); delays marriage decisions (Shemyakina, 2009; Curlin et al., 1976); and increases the incidence of divorce (Agadjanian and Prata, 2002; Woldemicael, 2008). Nonetheless, we look at census-level data prior to and after the ceasefire and find no differential change in the rate of married individuals in treated municipalities. In addition, the documented post-ceasefire differential fertility increase is not driven by the age-windows at which most women marry in Colombia.

Third, the end of conflict may trigger the restoration of loss of healthcare infrastructure and increase access to maternal, sexual and reproductive health (Chukwuma and Ekhator-Mobayode, 2019; Gopalan et al., 2017; Tunçalp et al., 2015; Chi et al., 2015; Price and Bohara, 2013). We examine a range of variable related to health infrastructure and the operation of the health sector (such as the rate of birth attended by a qualified professional and the number of ambulances and hospital beds) and find that, by and large, they do not significantly improve after the ceasefire in treated municipalities.

Fourth, large violence drops may mechanically increase fertility rates if newborns die or their health deteriorates because of conflict. Indeed, a strand of the literature has found that intrauterine exposure to violence (Mansour and Rees, 2012; Eskenazi et al., 2007; Camacho, 2008) or to natural disasters (Aizer et al., 2016; Almond et al., 2018; Khashan et al., 2008) increases fetal mortality as well as the incidence of low birth weight. However, we find no evidence that outcomes such as weight at birth or the mortality rate of newborns changed differentially after the ceasefire in areas more exposed to FARC violence.

Finally, civil wars are often fought by insurgent groups that enforce strict rules about romantic partners and fertility, in which case post conflict baby booms may be driven by the behavior of demobilised ex-combatants. In contrast, we find no significant heterogeneous effects in municipalities where former FARC combatants concentrated as a result of the peace agreement.

It is worth noting that a different strand of the literature highlights mechanisms consistent with the opposite effect of peace on fertility, namely that fertility rates are higher in periods of high violence (Akseer et al., 2020; Torres and Urdinola, 2019; Urdal and Che, 2013) and decrease after the end of conflict (Clifford et al., 2010). For instance, inasmuch as violence is negatively associated with economic development, parents may have more children in the context of high levels of violence under the expectation that children may provide care and economic aid to their parents down the road (Verwimp and Bavel, 2005). Similarly, in violent environments, couples may hoard more births than desired if they anticipate that some of their children may die (Schultz, 1997).

Thus, our results place our paper in the literature that finds a negative relationship between violence and fertility.

The above discussion shows how our paper contributes to the extensive literature in the intersection of development economics, health and demography on the relationship between violence –or other shocks such as natural disasters- on health outcomes in general and fertility dynamics in particular. Specifically, we document how violence reductions in contexts of low intensity and long-lasting conflicts may result in differential fertility increases in conflict-affected areas and highlight a novel mechanism explaining such results. Moreover, this paper contributes to the growing literature that studies the consequences of conflict termination, particularly the end of the 5-decade long conflict between FARC and the Colombian state. Other papers highlight significant unintended negative consequences of the peace agreement in terms of the security of local social leaders (Prem et al., 2020b) and the dynamics of deforestation (Prem et al., 2020a), as well as the positive implications of peace for human capital accumulation (Prem et al., 2021).

The rest of the paper is organised as follows. Section 2 provides some context about Colombia's armed conflict and its health care system. Section 3 describes the main data sources and the measurement of key variables. Section 4 describes our identification strategy that estimates the causal effect of the ceasefire on fertility rates as well as on other intermediate outcomes. Section 5 reports our main results and robustness checks, and section 6 discusses the evidence in favour or against a range of potential mechanisms. Finally, Section 7 concludes.

2 Context

2.1 Colombia's internal armed conflict and the peace process with FARC

Colombia's internal armed conflict started with the launch of two nation-wide guerrilla movements in the 1960s: FARC and the *National Liberation Army* (ELN from the Spanish acronym). Inspired by the Cuban and Chinese revolutions, these and other guerrilla groups that formed later claimed to represent the rights of peasants and workers and fought for over 50 years with the goal of overthrowing the government to build a socialist regime.

While left-wing insurgent movements were initially located in peripheral rural areas, over decades they have sought to expand its territorial dominance. In turn, territorial contestation with government forces as well as with illegal right-wing paramilitary groups has resulted in violence throughout large part of the country's territory. Violence is further shaped by the scope of illegal activities, which cannot be enforced in courts. Indeed, FARC and other guerrillas have engaged in a range of illegal activities including kidnapping, extortion and looting (Richani, 1997), as well as in illegal drug production and trafficking. Most of the almost 9 million officially recognised victims of the conflict are from rural areas.[4] During the 1990s the conflict escalated, fuelled by the drug business as well as by the consolidation of a third force: the right-wing paramilitary groups. In the mid 1990s originally splintered private armies and rural self-defense armed groups joint forces under the umbrella organization *United Self-Defense of Colombia* (AUC by its Spanish acronym).

In October 2012, the Colombian government and FARC started peace negotiations in Cuba. One of the most significant milestones of the process was the establishment of a unilateral permanent ceasefire by FARC on December 20, 2014. While a temporal cease of hostilities was commonly announced by FARC to observe the Christmas festivities, a permanent ceasefire was unprecedented and unexpected. FARC did so to signal to the government negotiating team its unified nation-wide command structure as well as its commitment to reaching a peace agreement. Ultimately, the ceasefire was largely met and it was replaced by the definitive bilateral ceasefire and the subsequent disarmament of FARC in mid 2016, when the final peace agreement was reached. This explains why FARC's offensive activities dropped by 98% during this period (CERAC, 2016). Thereafter, FARC soldiers withdrew from the guerrilla strongholds and settled in the so-called *Transitory Normalization Zones of Transformation* (ETCR from its Spanish acronym), where the reincorporation programs devised by the peace agreement were to be implemented.

To understand the dynamics of violence during our sample period, Figure 1 reports the evolution of different proxies of conflict-related violence in municipalities exposed and non-exposed to FARC violence prior to the start the ceasefire. Specifically, panel (a) plots the average number of violent events, including selective murders, attacks on the population, terrorist attacks, damage to property and civilians, forced disappearance, massacres, kidnappings, sexual violence and recruitment. Panel (b) reports the average number of victims from anti-personnel landmines, and panel (c) presents the evolution of the number of victims of internal forced displacement. While in all cases the levels are, by constriction, much higher in treated municipalities, these levels drop substantially shortly before the ceasefire (coinciding with the start of peace negotiations), and largely converge to the levels of control municipalities.[5]

[4]Source: Victims' Registry, from the Unit for the Victims Assistance and Reparation, November 2020 figure. Available form: https://www.unidadvictimas.gov.co/en (last accessed 11/21/2020).

[5]Note, however, that in 2017, both types of municipalities experienced an increase in mine victims, and treated municipalities an increase in internal forced displacement.

2.2 The Colombian health system

Universal public health care in Colombia is a constitutional right (see articles 44 and 49). Law 100 of 1993 created the General System of Social Security in Health (SGSSS from the Spanish acronym), which introduced competition in both insurance and care provision through a managed-care model that includes both public and private health providers (Bardey and Buitrago, 2017). SGSSS aims at covering the entire population by combining a *contributory* regime (for patients with payment capacity) with a *subsidized regime* (for patients without payment capacity or else for vulnerable communities prioritized by the government).[6] In 2019, 95 per cent of the population was affiliated to the SGSSS, with about 45 per cent of the patients belonging to the contributory regime and a similar figure to the subsidized regime. The residual share of the population belonged to a special regime (MinSalud, 2019). While in principle patients of both regimes have access to the same healthcare benefits, in practice specific insurers limit access to certain benefits (Vargas et al., 2010).

Colombia is an interesting case to study the relationship between conflict deescalation and fertility. On the one hand, the 2016 peace agreement with FARC ended a 5-decade conflict against this guerrilla organization, one of the oldest and largest insurgency of the world, and with presence throughout the entire Colombian territory. On the other, Colombia's total fertility rate (TFR) was 1.82 children per woman during the period 2015-2020 (UN, 2019). While this figure is slightly smaller than the average of Latin America and the Caribbean (2.04), it lays close to the upper limit of the TFR range of OECD countries (from 1.4 to 1.9) (OECD, 2019).[7]

3 Data

In order to study the effect of the ceasefire on fertility rates as well as on intermediate outcomes related to the demand for health care and to health-at-birth outcomes, we constructed a municipality-year level panel with information from multiple sources. We focus on the period from 2011 to 2018, with the ceasefire taking place in December 2014.[8] The sample includes all Colombian mu-

[6] In addition, members of the military and police forces, public teachers with a staff contract and employees of the Colombian Petroleum Company (ECOPETROL) have special public health schemes.

[7] In April 2020, Colombia offcially became an OECD member.

[8] 2011 is the first full presidential year of president Juan Manuel Santos, who successfully managed to start formal peace talks with FARC and bring them to the point of declaring a permanent ceasefire. During this period, FARC's violent dynamics are quite different than during the years before, marked by president Uribe (2002-2010)'s harsh anti-insurgent campaign that pushed FARC to retreat and reduce its violent activity. By defining the treatment during the four-year window before the ceasefire we are thus capturing the differential effect of the ceasefire on the areas that were most affected toward the end of the conflict with FARC. In any case, it is important to highlight that our results are not

nicipalities except the large cities (with populations of at least 200,000 people in 2010 according to projections from DANE, Colombia's statistics bureau). The resulting number of municipalities is 1,092.[9] Importantly, we weight our observation by the number of births between 2011 to 2014 from women between 15 and 49 in each municipality. We now the main variables and their source. For a complete list of all the variables used in the paper, together with their source, we refer to Table A.1 in the Appendix.

3.1 Conflict data

To construct a measure of exposure to FARC violence before the start of the ceasefire, we use the conflict dataset originally compiled by Restrepo et al. (2003), and updated through 2014 by Universidad del Rosario. This dataset codes violent events recorded in the *Noche y Niebla* reports from the NGO *Center for Research and Popular Education* (CINEP from the Spanish acronym), which provides a detailed description of the violent event, its date of occurrence, the municipality in which it took place, the identity of the perpetrator, and the count of the victims involved in the incident.[10]

To measure FARC attacks, we first created a continuous measure based on the total number of FARC attacks over 10,000 inhabitants that took place from 2011 to 2014 in a municipality. We standardized the continuous measure using the mean and standard deviation from the empirical distribution. While our main results will be based on this continuous treatment definition, for robustness we construct a second measure based on a dichotomous version of it. The latter takes the value of 1 if there was at least one violent case by FARC during the same period. Based on the latter treatment definition, 99 municipalities (9% of our sample) resulted as exposed to FARC violence before the ceasefire.

3.2 Vital statistics and health care

Civil registration and vital statistics (CRVS) systems are the most widespread source of health indicators and are commonly used to study population dynamics, to set public health goals and

just an artifact of the period picked for the treatment definition. They are robust to expanding the period all the way until the start of Uribe's first term (2002).

[9]We drop major cities and capitals to make the sample more comparable but our results are robust to not excluding them.

[10]*Noche y Niebla* sources include 1. Press articles from more than 20 daily newspapers of both national and regional coverage. 2. Reports gathered directly by members of human rights NGOs and other organizations on the ground, such as local public ombudsmen and, particularly, the clergy (Restrepo et al., 2003). Notably, since the Catholic Church is present in even the most remote areas of Colombia, we have extensive coverage of violent events across the entire country.

to conduct academic and advocacy-based research. Colombia has a reliable vital statistics system, which registers around 95 per cent of all births and 86 per cent of the deaths that take place in the country (Colombia Implementation Working Group, 2018; Toro Roa et al., 2019). Vital statistics in Colombia are part of the administrative *Integrated Information System of the Ministry of Health and Social Protection* (SISPRO from the Spanish acronym). Using these data we construct municipality-year level TFR as follows:

$$TFR = \frac{\sum_{a=15-19}^{45-49} f_a}{1,000} \tag{1}$$

where f_a is the age-specific fertility rate (ASFR) of women whose age corresponds to the five-year age group a.[11] To compute it, we use the annual number of births based on the mother's municipality of residence, not the baby's place of birth.

Annual births are in turn computed from administrative birth registration counts. Birth registration is based on a live birth certificate issued by the health professional that attends the birth.[12] In the absence of a live birth certificate (for instance because the child was born in a place other than a health care facility), the birth can be registered by a civil registry servant based on a sworn statement by two witnesses present at the birth (Toro Roa et al., 2019). Colombia's statistics bureau consolidates, validates, and processes information from all birth certificates (DANE, 2012).

CRVS also include mortality data. From it, we compute a range of mortality rates using as denominator 1,000 live births. These include neonatal mortality rates (deaths occurring during the first 28 days of life), infant mortality rates (deaths under the age of 1) and under-5 mortality rates. We also construct deaths associated with acute respiratory infections (ARI) and acute diarrhoeal disease (ADD) for children under 5 years. These are two of the most common causes of child death associated with poor socioeconomic conditions which correlate with a lack of access to basic health services (Alvis-Zakzuk et al., 2018).

CRVS further includes the number of antenatal care contacts during pregnancy (WHO recommends 8 prenatal care visits WHO, 2018), as well as outcomes associated with pregnancy health such as the incidence of low birth weight (LBW, defined as less than 2,500 grams), preterm births (less than 37 weeks of gestation), the APGAR test, and C-sections.

[11] We focus on the following seven five-year age groups: 15 to 19; 20 to 24; 25 to 29; 30 to 34; 35 to 39; 40 to 44; and 45 to 49.

[12] In most cases, the health professional can be a doctor, nurse, nursing assistant or health promoter (DANE, 2012). Indigenous people have the Intercultural System of Indigenous Own Health (SISPI from the Spanish acronym) with health care facilities integrated to the General System of Social Security in Health (See https://www.minsalud.gov.co/proteccionsocial/promocion-social/Paginas/Pueblos-indigenas.aspx (last accessed 31/08/2020)).

In turn, from SISPRO we obtain information related to the demand for health services that is covered by the mandatory health insurance system.

3.3 Municipalities characteristics

We complement these data with a large set of municipality characteristics from different sources. The primary source is the annual panel of Colombian municipalities, maintained and hosted by the *Center for Economic Development Studies* (CEDE from the Spanish acronym). We obtained the measures of the share of people leaving in rural areas, the distance of each municipality to the department's capital, and a multidimensional poverty index.

We also use proxies of the violent presence of illegal armed groups other than FARC in a municipality (from Prem et al., 2020a), an indicator of the municipalities selected to host the ETCR (from the *Agency for Reincorporation and Normalization*), data on landmines victims (from the Office of the High Commissioner for Peace in Colombia), and information on internal forced displacement (from Colombia's Victims' Registry).

Finally, we use administrative databases other than those described in the previous subsection, including the 2005 and 2018 population censuses (DANE, 2005, 2020) and information on the health infrastructure per municipality and per year (from the *Special Register of Health Service Providers*, REPS).

Table 1 reports pre-ceasefire descriptive statistics of the main variables. During that period there were, o average, 1.6 live births per woman and the highest ASFR was that of women on the 20 to 24-year old window. In turn, Table 2 reports the pre ceasefire differences between treatment and control municipalities across all the main variables. Municipalities that experienced FARC violence were on average different from non-exposed areas in several characteristics. These level differences, however, do not prevent us from estimating the causal effect of the ceasefire on fertility rates and other intermediate outcomes and potential mechanisms, and we explain in the next section.

4 Empirical strategy

4.1 Main specification

To estimate the effect of the end of the conflict between the Colombian state and the FARC guerrilla, we exploit two sources of variation. First, the temporal variation is given by the timing of the permanent ceasefire announced by FARC on the 20th December 2014. Second, the cross sectional variation comes from the level of pre-ceasefire FARC violence across municipalities. More formally, using the subindex m to denote municipalities, d to denote departments, and t to denote years, we estimate the following *difference-in-differences* specification:

$$y_{mdt} = \alpha_m + \delta_{dt} + \beta_1 \left(Cease_t \times FARC_m \right) + \sum_{c \in X_m} \gamma' c \times Cease_t + \varepsilon_{mdt} \tag{2}$$

where y_{mdt} is the TFR in municipality m, located in department d, during year t. α_m and δ_{dt} are municipal and department-time fixed effects that capture any time-invariant municipal level heterogeneity and any aggregate department-level time shock, respectively. $Cease_t$ is a dummy that equals one after the start of the permanent ceasefire (hence 2015 onward) and $FARC_m$ measures pre-ceasefire exposure to FARC violence. X_m are municipality characteristics measured before the ceasefire. We interact these characteristics with the $Cease_t$ dummy to account for differential changes after the ceasefire in our outcome of interest, driven by these municipality features. Finally, ε_{mdt} is the error term clustered at the municipality level. Our coefficient of interest, β_1, captures the differential change in the TFR after the start of the ceasefire relative to before, in municipalities more exposed to FARC violence relative to those less exposed to it.

Throughout the paper, all regressions are weighted by the number of live births prior to the ceasefire (from 2011 to 2014) for each age group. We do so based on the mother's municipality of residence. This weighting procedure gives more importance to municipalities that traditionally contribute more to fertility rates in the country, thus minimizing the role of atypical fertility rates in small municipalities. Moreover, for outcomes based on averages of individual births, this procedure gives equal importance to each newborn in the sample. As robustness, however, we also consider the unweighted estimates.

4.2 Identifying assumption

The main assumption behind the *difference-in-differences* model is that, in the absence of the ceasefire, the TFR in municipalities more exposed to FARC violence would have evolved similarly to those in municipalities less exposed. The validity of this *parallel trends* assumption can be partially assessed by estimating the following dynamic version of the main specification:

$$y_{mdt} = \alpha_m + \delta_{dt} + \sum_{j \in T} \beta_j (FARC_m \times \delta_j) + \varepsilon_{mdt} \tag{3}$$

where T includes all years of our sample period except 2014, which is the year right before the ceasefire. Therefore the parameters β_j can be interpreted as the difference in the TFR in municipalities more exposed to FARC attacks compared to municipalities less exposed, in year j relative to the year right before the ceasefire started.

4.3 Disentangling potential mechanisms

We augment the main specification in equation (2) to test for heterogeneous effects by municipal-level characteristics. We do so by adding a third interaction term. Specifically, let the municipality characteristic Z_m (measured before the ceasefire, except for the ETCR) be a potential mechanism of interest. We estimate:

$$\begin{aligned} y_{mdt} = \alpha_m + \delta_{dt} + \beta_1(Cease_t \times FARC_m \times Z_m) + \beta_2(Cease_t \times Z_m) \\ + \beta_3(FARC_m \times Z_m) + \beta_4(FARC_m \times Cease_t) + \varepsilon_{mdt} \end{aligned} \quad (4)$$

Our coefficient of interest, β_1, captures the differential change in the outcome variable in places more exposed to FARC attacks and with municipality characteristic Z_m. In addition, to interpret this coefficient in a causal way, a similar "parallel trends" assumption has to hold but for municipalities both more exposed to FARC violence prior to the ceasefire and with municipality characteristics Z_m. Hence, to partially assess the validity of this assumption we estimate a version of equation (3) but for the triple interaction.

Using the above specifications, we estimate the differential impact of the permanent ceasefire on the TFR in areas previously exposed to FARC violence (equation (2)), the dynamic evolution of this effect (equation (3)), and heterogeneous effects given by an array of municipality characteristics (equation (4)). The next section reports the estimated results, together with a large set of robustness checks.

5 Results

5.1 Main results

Table 3 reports the empirical estimates of equation (2). Column 1 includes municipality and year fixed effects, Column 2 includes municipality and department × year fixed effects, and Column 3 builds on the specification of Column 2 and further controls for differential changes in the TFR after the ceasefire, parametrized by several pre-ceasefire municipality characteristics.[13]

Our estimates suggest that a one-standard-deviation increase in the number of FARC attacks per 10,000 inhabitants over the period 2011-2014 causes a differential increase in the TFR of 0.04 births per woman after the ceasefire. This effect is equivalent to 0.07 standard deviations (=0.04/0.598), or to 2.6 per cent of the TFR sample mean (=0.04/1.55). In context, the Zika virus epidemic that threatened a terrible disease for newborns (microcephaly) in urban areas of the country in 2016 reduced birth rates by 10 per cent (Gamboa and Rodríguez-Lesmes, 2019). It is statistically significant at the 1 per cent level. Moreover, both the magnitude and the statistical significance are robust to estimating the more demanding models of Columns 2 and 3.

These results are robust in various dimensions. For instance, while our baseline treatment definition uses the continuous per capita measure of FARC attacks over the period 2011-2014, our results are robust to using several alternative measures of exposure to FARC violence, such as a discrete version of the treatment based on the extensive margin of FARC attacks or measuring the exposition to FARC violence over alternative time windows before the start of the ceasefire.[14] Also, recall that for our baseline results we estimate equation (2) weighting the observations by the number of live births between 2011 and 2014. However the results are very similar if we estimate the unweighted version, that estimates the average effect of the ceasefire on the TFR across municipalities and regardless of their size (see Appendix Table A.6, columns 7 to 12).

Based on the most demanding specification, Table 4 estimates the same regression model for various age-specific fertility rates to explore whether the effect found for the TFR is driven by specific age brackets. We measure the ASFR in five-year age groups, covering the range 15 to 49. Interestingly, we find that the ceasefire caused a differential fertility increase across the board, perhaps not surprisingly with the exception of women aged 45 to 49. Moreover, we cannot reject that the magnitude of the effect is the same across all groups from 15 to 44.

[13] These include the infant mortality rate, the number of victims related to anti-personnel landmines, the share of the rural population, the distance from each municipality's centroid to its department capital, a poverty index, and the logarithm of the 2010 municipal population.

[14] With the first alternative measure we find that municipalities that experienced at least one attack by FARC over the period 2011-2014 witnessed a differential increase of 0.08 children per woman after the start of the ceasefire, equivalent to 5.2 per cent of the TFR sample (see Appendix Table A.6, Columns 4 to 6). For the second we backdate our sample period to 200 (2002), the year that marks the first year of president Alvaro Uribe's second (first) presidential term. Measuring the exposition to FARC violence during these alternative period produces remarkably similar results, as shown in Appendix Table A.7 and Appendix Figure A.2.

5.2 Identifying assumption

Recall that the validity of our empirical strategy relies on the assumption that, absent the ceasefire, fertility rates would have followed the same trend in treated and control municipalities. In this subsection we show evidence consistent with the empirical validity of this assumption.

First, in Figure 2, we plot the estimated coefficients –together with the 95 per cent confidence interval–obtained from estimating equation (3). The figure has the same structure of Table 3: the estimates in Panel (a) include municipality and year fixed effects; those in Panel (b) include municipality and department×year fixed effects; and Panel (c) adds to the latter specification a set of pre-ceasefire controls interacted with the year fixed effects. It can be seen in all panels that the estimated coefficients are not statistically significant before the ceasefire, and the point estimates are close to 0. This result points to the absence of differential trends in the TFR before the ceasefire between municipalities more exposed to FARC violence and places that were less exposed. Moreover, in all Panels the Figure shows how the point estimates increase in magnitude and become significant after the permanent ceasefire, and the magnitude increases over time. The equivalent Figure is reported in the Appendix for each ASFR (Figure A.1), with similar effects in terms of absence of pre-trends and post-ceasefire dynamics.

Second, following Muralidharan and Prakash (2017), we conduct a more parametric test for the existence of differential linear pre-trends between 2011 and 2014. We do so by interacting a linear trend with our measure of high exposure to FARC violence, and testing the significance of the associated coefficient before the ceasefire.[15] The results are reported in Panel A of Table A.2 in the Appendix, and show no evidence of differential trends before the ceasefire, neither for the TFR nor for most of the ASFR.

Third, we perform a placebo exercise in which we estimate the main specification (equation 2) limited to the pre-ceasefire period (2011-2014), and use as *placebo ceasefire* a series of dummies that equal 1 starting each year from 2012 to 2014. The results are shown in Tables A.3, A.4, and A.5 of the Appendix. We find that there is no differential change neither in the TFR nor in any of the ASFR in areas more exposed to FARC attacks relative to other areas. Again, these results are consistent with the absence of differential pre-trends before the ceasefire.

Finally, while our baseline sample period starts in 2011, we find no differential pre-trends once we add more pre-ceasefire years. Appendix Figure A.3 shows the non-parametric extending the start

[15] The specification we run is $y_{mdt} = \alpha_m + \lambda_{dt} + \beta(FARC_m \times Trend_t) + \epsilon_{mdt}$, where $Trend_t$ is a linear trend and we restrict the sample to the years 2011 to 2014. Our parameter of interest, β, shows whether there are differential linear trends in municipalities more exposed to FARC's violence.

year of the sample period 4 years, from 2011 to 2007. The absence of any differential pre-trend gives extra support for our empirical design.

Taken together, this set of results largely validate our empirical strategy and provide credibility to our main result, namely that FARC's permanent ceasefire triggered a differential increase in fertility rates in treated areas.

6 Mechanisms

This section explores the empirical relevance of several potential mechanisms through which the start of the ceasefire differentially increased the TFR and ASFR in municipalities previously affected by FARC violence. Understanding the potential mechanisms is essential for developing policy responses to take advantage of the ceasefire's positive effects, as well as counteracting its potentially adverse consequences.

6.1 The reduction in victimization and the perception of security

Illegal armed groups engage in violent coercion to influence various domains of the local life in the communities where they are present. By doing so, they influence politics, economics, social relations, and even people's private life. In the specific case of the Colombian conflict, the available evidence suggests that illegal armed actors often regulate mobility, establishing rules about when civilians could be outside their homes, travel, or cross a municipal border. This largely limits the extent of social interactions within conflict affected communities (Arjona, 2016). In addition, territorial contestation often entails the use of violence (selective or collective) against civilians. Thus, for reasons either related to territorial dispute or territorial control, people living in conflict-affected areas likely face a non-negligible risk of victimization (Kalyvas, 2006). Colombia's long conflict is not the exception. It resulted in almost 9 million victims registered with the government, about 17 per cent of the country's population.[16]

In such contexts of uncertainty and deprivation, parents may be less willing to commit to long-term decisions. In turn, the end of conflict may trigger generalized feelings of improved security and optimism, which drive fertility choices especially in the areas more affected by violence. We assess the empirical relevance of this potential mechanism in different ways. First, we estimate equation (4) to explore if there are any heterogeneous effects in municipalities that suffered excep-

[16] The Victim's Registry is a mechanism created by the government to assist and provide reparations the conflict victims. Its scope is only partial because the Registry's legal framework only recognises victims as of 1st January 1985.

tionally high levels of violence prior to the ceasefire. We do so by looking at differential effects based on episodes of the explosion of landmines and on instances of internal forced displacement of civilians that occur before the ceasefire.

The results from these test are reported in Columns 1 and 2 of Table 5. We find that the differential increase in fertility rates is larger in places that witnessed more land mines explosions (Column 1) and expelled more internal refugees prior to the start of the ceasefire (Column 2). This is relevant because Colombia was the second country with the most accidents registered with anti-personnel landmines in 2014 (after Afghanistan), with 286 recorded casualties (Monitor, 2015). Colombia is also the second country with the largest refugee population after Palestine.[17]

Panels (a.1) and (a.2) of Figure A.4 show the dynamic difference-in-differences specification for each of these heterogeneous effects. We observe that differences prior to the ceasefire for both of them are no significant (with the exception of one year for the incidence of land mines' victims). This suggests that using these pre-ceasefire characteristics to understand the proposed mechanism is statistically reasonable. Moreover, the figure suggests that there is a differential increase in the TFR after the ceasefire in municipalities that had plausibly experienced higher levels of victimization.

These results are also consistent with the findings of Prem et al. (2021), who document that the ceasefire generated large differential improvements in a number of educational outcomes in areas formerly affected by FARC's violence, and differentially so in places with more mine victims and forced displacement prior to the ceasefire. This suggests that these municipalities became a safer place to raise their children, helping explain the differential increase in fertility.

Finally, we study a period heterogeneity that is potentially informative of the proposed mechanism. In the first two years after the start of the ceasefire (2015-2016), the peace negotiations were still ongoing and FARC was still present in its strongholds. However, from 2017 onward the implementation phase of the peace agreement started and FARC troops concentrated in a few areas that were targeted to receive reincorporation programs in the context of the DDR protocols established by the agreement (called ETCR). In this sense, while the first sub-period was characterized by a large reduction in violence following the ceasefire, during the second the perception of security may have further improved due to the departure of former FARC combatants.

To test this temporal heterogeneity we estimate a version of equation 2 that adds an interaction

[17] See https://www.unrefugees.org/news/forced-displacement-worldwide-at-its-highest-in-decades/ (last accessed 05/27/2021).

between a dummy that equals 1 since 2017 and the measure of high exposure to FARC violence. The results are reported in Appendix Table A.8. Focusing on the most demanding specification (Column 3), we find that the effect for the initial two years after the start of the ceasefire is 0.03 additional births per woman, and the total effect for the latter period is 0.07 (0.03+0.04). This implies that violence reduction causes a differential fertility increase in treated municipalities that is 43 per cent ($= 0.03/0.07$) of the effect caused by both violence reduction *and* the additional perception of security that the departure of FARC may have induced.

6.2 Child replacement

A second potential reasons behind the observed post-ceasefire dynamics in fertility rates in treated and control municipalities has to so with the *child replacement* theory. In other contexts, it has been documented how parents may want to replace children who were lost as a result of the conflict (Schindler and Bruck, 2011; Rutayisire, 2014; Kraehnert et al., 2018; Heuveline and Poch, 2007).

We test this mechanism by estimating we estimate equation (4) to explore if there are any heterogeneous effects in municipalities where infant mortality was higher before the ceasefire.[18] Column 3 of Table 5 shows this is not the case. Further, Panel (a.3) of Figure A.4 shows that this differential effect was zero for all the years before the start of the ceasefire, as well as afterwards. Hence, we find no empirical support for this mechanism.

6.3 Marriage markets

There is evidence that conflict may disrupt marriage markets, as it generates a shortage of eligible men (De Walque, 2006); delays marriage decisions (Shemyakina, 2009; Curlin et al., 1976); and increases the incidence of divorce (Agadjanian and Prata, 2002; Woldemicael, 2008). In turn, conflict termination could restore the functioning of these disrupted markets and therefore have a positive effect on fertility.

We assess this potential mechanism by testing whether the places that were more affected by FARC violence witnessed a differential increase in the rate of married individuals after the start of the ceasefire. To that end we estimate a version of equation (2) using as dependent variable census-based proportion of married (or cohabiting with a partner) individuals between 18 and 49 years of age.[19] The results are reported in Table A.9. We find no differential change in the rate of

[18] This is defined as the number of deaths of children under 1 year per 1,000 live births, between 2011 and 2014.

[19] Limited by the census years, this regression uses only two years of data: one prior to the start of ceasefire (the 2005 census) and one afterwards (the 2018 census). Hence, the dynamic specification cannot be estimated for this outcome.

married or cohabiting individuals in treated municipalities.

In addition, using data from MinSalud and Profamilia (2017), we estimate that the median age at with women marry or start cohabiting in Colombia is 21.4 years. However, recall from Table 4 that the differential increase in the TFR in treated municipalities is not driven by the 20-24 age window (nor by any specific age bracket for that matter).

6.4 Healthcare delivery systems

Fertility rates may have differentially increased in treated municipalities due to a proportionally better improvement in the quality of health services in these areas relative to places less exposed to FARC violence. This may be the case, for instance, if post-conflict investment in public goods and basic services targeted former FARC strongholds more than other areas. If so, this may have resulted in an increase access to maternal, sexual, and reproductive health.

We test this hypothesis by estimating equation (2), examining the dynamics of a range of variables related to health infrastructure and the functioning of the health sector before and after the start of the ceasefire and in treated municipalities relative to the control. The results are reported in Table 6. Column 1 looks at the number of prenatal care visits and finds a statistically significant differential increase of 0.03 visits in treated municipalities after the start of the ceasefire. However, this effect is very small, equivalent to 0.5 per cent of the mean. Column 2 considers the proportion of births attended by a health care professional or a traditional midwife. The lack of a significant effects rules out that the observed increase in the TFR is explained by the behavior of formal birth and registration channels rather than by an actual differential fertility increase.[20]

Further, Columns 3 to 6 examine variable related to health services and infrastructure (normalized by 1,000 inhabitants). We find that the ceasefire did not translate in a significant differential improvement in the number of ambulances, the number of maternal therapeutic support, the number of hospital beds, or number of hospital wards in treated municipalities.

In addition, Figure A.5 reports the dynamic non-parametric estimates for these outcomes, confirming graphically that most of them do not react to the ceasefire by changing differentially in treated municipalities. If anything, the availability of some health care services might have differentially declined.[21]

[20]In fact, as reported in Table 1, the proportion of births attended by health care professional was already 97 per cent before the ceasefire.

[21]The parametric test for differential pre-trends is presented in Table A.2 and and the placebo tests are presented in Tables A.3, A.4, and A.5. In both cases, we do not find evidence of differential pre-trends.

The lack of empirical validity of this mechanism is probably due to the fact that long-lasting, low intensity conflicts such as Colombia's are less destructive of key social infrastructure and thus less disruptive of basic services such as education and health. Fore instance, while there were cases in which health professionals were caught in the middle of conflict, they were usually allowed to work (Arjona, 2016). Moreover, any service disruption may take a long time to overcome, while our post-ceasefire sample period only lasts four years.

6.5 Child health improvement

Related to the previous mechanism, conflict may affect the health of existing children as well as that of newborns. If so, then large violence drops may mechanically increase fertility rates. Moreover, improvements in the health of children may increase the returns of fertility.

We test the empirical relevance of this potential mechanism by looking at the extent to which the ceasefire differentially affected the survival of children, an outcome typically associated with better health services. Specifically, we estimate equation (2) on the neonatal mortality rate, infant mortality rate and under-5 mortality rate. For the latter outcome, we distinguish between the overall mortality rate, the mortality rate due to acute diarrhoea disease (ADD) and that due to acute respiratory infection (ARI). ADD and ARI are two of the most common underlying causes of death for children under the age of 5. The results are reported in Table 7, columns 1 to 5. We find no significant differential change in any of the child mortality rates in treated municipalities after the start of the ceasefire. Figure A.6 reports the non-parametric estimates for these outcomes, confirming graphically that neither of then presented differential pre-trends prior to the ceasefire, and that most of them do not react to the ceasefire by changing differentially in treated municipalities.[22]

A second channel through which this mechanism may operate is through improvements in the health conditions of newborns. For instance, if the reduction in violence results in mothers experiencing less stress, or else if the age composition of mothers changed in treated municipalities, then fertility may increase via better health outcomes of babies at birth. Table 8 shows the results of estimation the main specification (equation 2) on classic indicators of newborn health. We find no significant differential effect of the ceasefire on low birth weight (LBW, defined as less than 2,500 grams at birth), on the 1 or 5 minute APGAR, on preterm births (defined as births taking place before week 37 of pregnancy), or on the share of births through C-section. In turn, Figure A.7 shows

[22]The parametric test for differential pre-trends is presented in Table A.2, and the placebo tests are presented in Tables A.3, A.4, and A.5. In both cases, we do not find evidence of differential pre-trends.

that there are no differential pre-trends or post-ceasefire effects for most of these outcomes.[23]

6.6 Changes in the fertility of ex-combatants

The final mechanism that we consider is related to post-ceasefire changes in the fertility of former FARC soldiers. As many other insurgencies, evidence suggests that FARC interfered in the private lives of their members, prohibiting romantic relationships and interrupting pregnancies to avoid having small children in their camps (Arjona and Kalyvas, 2008). Several anecdotal accounts suggest that, after start of the ceasefire, the possibility of raising their children encouraged some FARC members to have babies.[24] This could, at least partially, explain our findings.

We test this potential mechanism by estimating equation (4) to look at heterogeneous effects in the municipalities in which FARC concentrated to receive reincorporation program and benefits (the ETCR). The results are reported in Column 4 of Table 5. We find no statistically significant differential increase in the TFR in municipalities ETCR municipalities. Moreover, Panel (a.4) of Figure A.4 reports the dynamic estimates of this heterogeneity. The figure shows no differential TFR pre-trends in treated municipalities before the ceasefire. It also suggests that after it there is a small –albeit no significant–differential increase in ETCR areas.

7 Conclusion

This paper contributes to the intersection of demography, health, and economics to study a policy-relevant research question: What is the short-term effect of the end of a long-lasting, low-intensity civil conflict on fertility? While we study the case of the recent peace agreement between the Colombian government and the FARC insurgency, this research question is potentially very relevant in other contexts as well.

To answer this question, we exploit the temporal variation given by the permanent ceasefire declared by FARC in December 2014, as well as the cross-sectional variation given by the pre-ceasefire exposure to FARC's violence. We find that a one-standard-deviation increase in the exposure to FARC violence prior to the ceasefire generates a statistically significant differential

[23]The parametric test for differential pre-trends is presented in Table A.2, and the placebo tests are presented in Tables A.3, A.4, and A.5. In both cases we do not find evidence of differential pre-trends.

[24]See https://www.theguardian.com/world/2017/feb/10/farc-peace-deal-baby-boom-pregnancy-ban, https://www.rcnradio.com/politica/durante-proceso-de-paz-cuantos-bebes-nacieron-de-excombatientes-de-las-farc and https://www.semana.com/agenda/articulo/ola-de-embarazos-en-la-guerrilla-de-las-farc-en-colombia/62262/ (last accessed 28/5/2021).

increase in the total fertility rate of 0.04 births per woman after the start of the ceasefire, equivalent to a 2.6 per cent of the average total fertility rate. Moreover, an effect of similar size (2 to 4 per cent of the average rate) is also present across a wide range of age-specific fertility rates, from 15 to 44 years.

This relative *baby boom* took place in a general context of declining fertility rates in Colombia. Thus, rather than an absolute increase in fertility, it represents a smaller fertility reduction in violence-affected areas during the post-ceasefire period.

We also shed light on the underlying mechanisms that explain the differential fertility increase in the violence-affected municipality after the start of the ceasefire. We rule out a number of the mechanisms traditionally highlighted by the literature to explain the observed baby booms observed after the end of high intensity and short conflicts or following natural disasters. These include the replacement of lost children, the recovery of marriage markets, and improved health infrastructure and services. Instead, we find supporting evidence favouring a less studied mechanism: Our results are consistent with a differential fertility surge driven by the generalised perception of security and optimism resulting from the ceasefire and the subsequent peace agreement.

Our findings, therefore, shed light on the broader question of how peaceful environments shape household decisions. Families are more willing to have children when they witness improvements in the environmental conditions that favour their nurture and development. Indeed, in addition to decreasing violence levels –and largely due to that– the Colombian ceasefire was followed by large short-term improvements in a range of educational outcomes, as documented by Prem et al. (2021). A safer environment where the returns to education can be harvested in the long run in favour of more productive citizens naturally affects fertility choices.

Clearly, however, the extent to which differential fertility increases are able to generate better outcomes down the road also depends on the role of local and federal governments in consolidating instances of early childhood stimulation programs that may reduce externalising behaviours and boost socio-emotional skills (Walker et al., 2011; Attanasio et al., 2016). This is also key to break the current epidemic of violence that sieges Latin America and the Caribbean.

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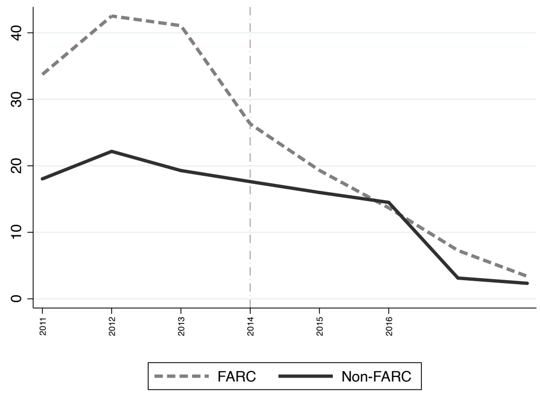
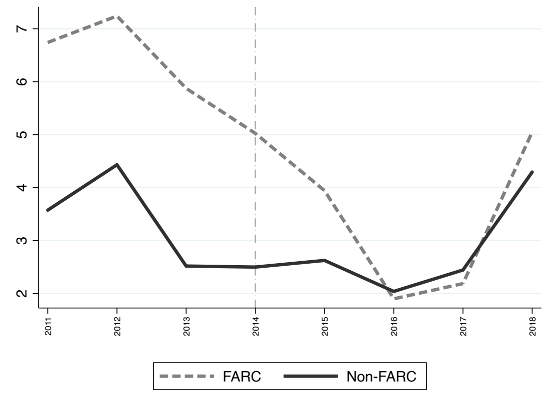
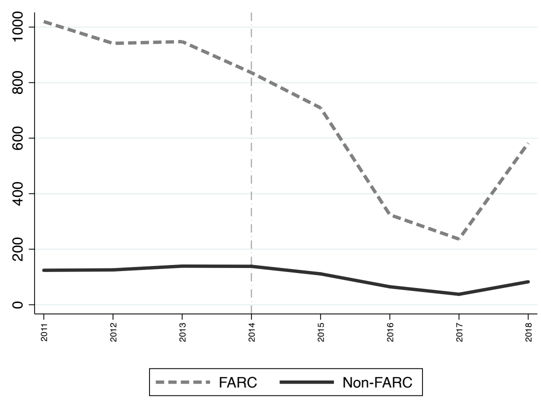
Figure 1: Evolution of conflict



(a) Violent cases



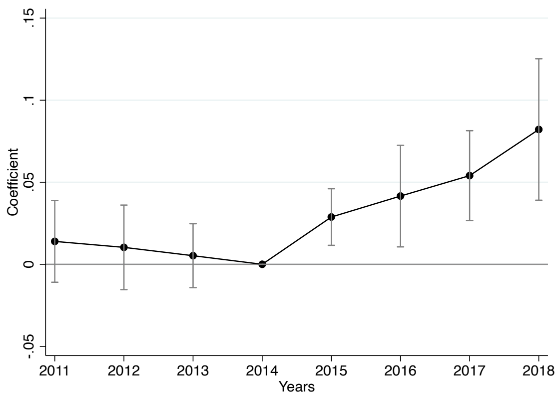
(b) Mines victims



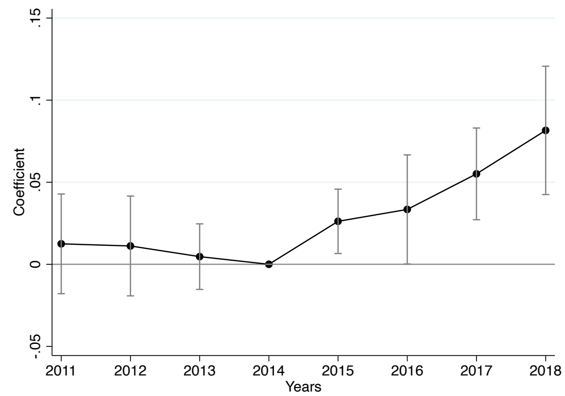
(c) Forced displacement

Notes: This figure presents the evolution of conflict for exposed and non-exposed municipalities to FARC attacks. A municipality is considered exposed if there was at least one violent event by FARC between 2011 and 2014. Panel (a) presents the average number of violent cases in a municipality (including selective murders, attacks on populations, terrorists attacks, damage to property and civilians, forced disappearance, massacres, kidnappings, sexual violence, and recruitment) as recorded by the Centro Nacional de Memoria Histórica. Panel (b) presents the average number of victims from anti-personnel landmines and unexploded ammunitions in a municipality, as recorded by the Office of the High Commissioner for Peace. Finally, Panel (c) presents the average number of victims expelled from a municipality due to forced displacement, based on information provided by the Victim's Registry.

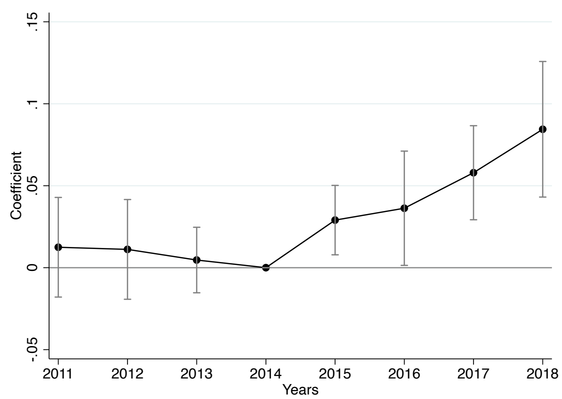
Figure 2: Dynamic difference-in-differences for total fertility rate



(a) Includes municipality and year fixed effects



(b) Includes municipality and department-year fixed effects



(c) Included municipality, department-year fixed effects, and baseline controls

Notes: These figures present the coefficients from our specification presented in equation (3). Panel (a) includes municipality and year fixed effects, Panel (b) includes municipality and department/year fixed effects, and Panel (c) includes municipality and department/year fixed effects, and baseline controls. We present the point estimates of the regressions and the 95% confidence interval.

Table 1: Summary Statistics

	(1) Mean	(2) Mean unweighted	(3) Standard deviation	(4) Median	(5) Min	(6) Max
Total fertility rate	1.90	1.61	0.59	1.83	0.00	8.06
ASFR for girls aged 15-19	82.27	67.46	26.18	80.70	0.00	208.33
ASFR for women aged 20-24	104.26	84.60	34.04	100.11	0.00	275.00
ASFR for women aged 25-29	86.55	71.98	30.41	81.75	0.00	379.31
ASFR for women aged 30-34	64.45	55.58	23.37	61.48	0.00	450.00
ASFR for women aged 35-39	35.40	30.88	14.65	33.33	0.00	200.00
ASFR for women aged 40-44	10.95	10.32	6.44	9.80	0.00	100.00
ASFR for women aged 45-49	1.77	1.02	2.54	1.04	0.00	71.43
Average of antenatal care visits	5.78	5.68	0.95	5.84	0.00	8.51
Births attended by health professional	98.08	97.26	5.58	99.59	0.00	100.00
Births attended by traditional midwife	1.92	2.74	5.58	0.41	0.00	100.00
Neonatal mortality rate	7.61	7.54	5.76	6.99	0.00	136.36
Neonatal mortality above 10	0.24	0.28	0.43	0.00	0.00	1.00
Infant mortality rate	24.77	25.23	16.56	22.81	0.00	545.45
Infant mortality above 18	0.67	0.56	0.47	1.00	0.00	1.00
Under-five mortality	15.40	16.07	10.04	13.99	0.00	318.18
ADD mortality in children under 5	4.46	3.93	19.27	0.00	0.00	830.26
ARI mortality in children under 5	15.32	12.89	28.46	0.00	0.00	581.40
Infectious and parasitic diseases rate	117.19	91.65	94.86	97.85	0.00	2418.51
Percentage of low weight at birth (<2500 grs)	7.76	7.79	2.43	7.51	0.00	100.00
Mean APGAR Test 1 Minute	8.20	8.15	0.26	8.20	4.00	9.12
Mean APGAR Test 5 Minutes	9.59	9.58	0.21	9.62	6.00	10.00
Preterm birth (<37 weeks)	17.34	17.08	4.20	17.17	0.00	100.00
Caesarean births	39.89	35.20	14.29	37.90	0.00	100.00
Ambulances	5.80	2.29	9.33	3.00	0.00	71.00
Therapeutic support	1.06	0.13	5.30	0.00	0.00	73.00
Hospital Beds	80.41	21.19	114.99	24.00	0.00	564.00
Medical wards	5.08	1.69	6.76	2.00	0.00	39.00
FARC attacks per 10,000 inhab	0.11	0.12	0.47	0.00	0.00	9.80
Victims of anti-personnel mines	7.18	4.88	10.93	3.00	1.00	52.00
Rural share	0.42	0.59	0.25	0.41	0.02	1.00
Distance to capital	81.57	83.32	63.45	65.63	0.00	493.08
Poverty index	64.97	70.35	19.39	68.77	14.27	100.00
Ln population	59,949.32	21,434.20	52,581.85	38,498.00	298.00	217,343.00
Municipalities		1092				

Notes: This table presents summary statistics for the main variables of interest before 2014. All columns present weighted (by the number of live births between 2011 to 2014 for each age group) versions of the summary statistics, except for Column 2.

Table 2: Municipality characteristics by exposure to FARC violence before the ceasefire

	(1)	(2)	(3)
		Exposure to FARC violence	
	Avg without FARC	Continuous	Discrete
Total fertility rate	1.88	0.01	0.11
	(0.57)	(0.01)	(0.07)
ASFR for girls aged 15-19	81.21	2.11***	6.95***
	(26.19)	(0.53)	(1.90)
ASFR for women aged 20-24	104.05	-0.81	1.58
	(33.83)	(0.79)	(3.51)
ASFR for women aged 25-29	86.41	-1.55**	1.07
	(30.06)	(0.62)	(3.75)
ASFR for women aged 30-34	64.09	-0.63	2.78
	(22.39)	(0.43)	(3.38)
ASFR for women aged 35-39	34.70	0.76***	5.20***
	(13.91)	(0.29)	(1.95)
ASFR for women aged 40-44	10.58	0.70***	2.77***
	(6.32)	(0.17)	(0.64)
ASFR for women aged 45-49	1.77	0.03	-0.03
	(2.65)	(0.06)	(0.14)
Average of antenatal care visits	5.85	-0.19***	-0.52***
	(0.94)	(0.02)	(0.06)
Births attended by health professional	98.28	-0.81***	-1.42***
	(5.71)	(0.12)	(0.30)
Births attended by traditional midwife	1.72	0.81***	1.42***
	(5.71)	(0.12)	(0.30)
Neonatal mortality rate	7.42	0.33***	1.32***
	(5.77)	(0.12)	(0.34)
Neonatal mortality above 10	0.23	0.03**	0.08*
	(0.42)	(0.01)	(0.04)
Infant mortality rate	24.19	1.25***	4.14***
	(16.57)	(0.35)	(0.92)
Infant mortality above 18	0.65	0.03**	0.15***
	(0.48)	(0.01)	(0.03)
Under-five mortality	14.99	0.88***	2.96***
	(10.02)	(0.21)	(0.55)
ADD mortality in children under 5	4.20	0.70*	1.85**
	(20.01)	(0.41)	(0.86)
ARI mortality in children under 5	15.06	0.83	1.82
	(29.24)	(0.58)	(1.66)
Infectious and parasitic diseases rate	113.59	3.90	25.85***
	(90.73)	(2.99)	(9.26)
Percentage of low weight at birth (<2500 grs)	7.86	-0.24***	-0.71***
	(2.51)	(0.04)	(0.13)
Mean APGAR Test 1 Minute	8.18	0.03***	0.11***
	(0.26)	(0.01)	(0.02)
Mean APGAR Test 5 Minutes	9.58	0.02***	0.07***
	(0.21)	(0.00)	(0.02)
Preterm birth (<37 weeks)	17.55	-0.40***	-1.54***
	(4.25)	(0.07)	(0.27)
Caesarean births	40.76	-1.89***	-6.25***
	(14.46)	(0.32)	(1.17)
Ambulances	5.87	-0.50***	-0.47
	(9.91)	(0.17)	(0.76)
Therapeutic support	0.89	-0.15**	1.23
	(4.14)	(0.08)	(1.26)
Hospital Beds	80.95	-11.96***	-3.87
	(119.47)	(2.01)	(11.75)
Medical wards	5.06	-0.67***	0.08
	(7.02)	(0.12)	(0.70)
Victims of anti-personnel mines	3.61	1.12**	6.27***
	(5.29)	(0.43)	(2.09)
Rural share	0.41	0.04***	0.07***
	(0.25)	(0.00)	(0.02)
Distance to capital	79.31	4.47***	16.23**
	(62.74)	(1.57)	(6.80)
Poverty index	63.69	3.33***	9.19***
	(19.89)	(0.43)	(1.23)
Ln population	10.52	-0.06***	0.28***
	(0.98)	(0.02)	(0.08)

Notes: This table presents univariate regressions based on municipality characteristics before the ceasefire. Column 1 presents the average of each variable before the ceasefire for municipalities non-exposed to FARC violence (without any violent event by FARC between 2011 and 2014). Columns 2 and 3 present estimated coefficients and standard errors from univariate regressions for the continuous and discrete treatment.

Table 3: Total fertility rate and ceasefire

	(1)	(2)	(3)
	Total Fertility Rate		
Cease × FARC	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)
Observations	8,736	8,736	8,736
Municipalities	1,092	1,092	1,092
R-squared	0.899	0.919	0.921
Municipality FE	Yes	Yes	Yes
Year FE	Yes	No	No
Dept-Year FE	No	Yes	Yes
Controls	No	No	Yes
Municipalities	1092	1092	1092
Mean Dep. Var.	1.551	1.551	1.551
Std. Dev. Dep. Var.	0.598	0.598	0.598

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. *Total Fertility Rate* is computed as the sum of age-specific fertility rates weighted by the number of years in each age group, divided by 1,000. Column 3 adds predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table 4: Age-specific fertility rates and ceasefire

	(1) ASFR 15-19	(2) ASFR 20-24	(3) ASFR 25-29	(4) ASFR 30-34	(5) ASFR 35-39	(6) ASFR 40-44	(7) ASFR 45-49
Cease × FARC	1.32**	2.75***	2.22***	1.45***	0.92***	0.57**	-0.05
	(0.58)	(0.89)	(0.77)	(0.56)	(0.35)	(0.26)	(0.09)
Observations	8,712	8,700	8,704	8,680	8,690	8,690	5,676
Municipalities	1089	1088	1089	1085	1087	1087	710
R-squared	0.866	0.887	0.862	0.828	0.765	0.631	0.410
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	67.58	84.66	71.92	55.77	30.99	10.33	1.565
Std. Dev. Dep. Var.	28.19	34.69	32.25	26.75	16.82	8.540	3.004

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. *Age-specific fertility rate* is the number of live births to women in the age-group per 1,000 population of women in the same age range in the municipality each year. All columns add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard errors at the municipality level are presented in parenthesis. *p is significant at the 10% level, **p is significant at the 5% level, ***p is significant at the 1% level.

Table 5: Heterogeneous effects by municipality characteristics

Dependent variable: Total fertility rate; Columns correspond to variable Z				
	(1)	(2)	(3)	(4)
	Mines victims	Forced displacement	Infant mortality	ETCR
Cease × FARC × Z	0.01**	0.02***	0.01	0.06
	(0.00)	(0.01)	(0.01)	(0.05)
Cease × FARC	0.03**	0.03*	0.04***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Cease × Z	-0.02**	-0.04***	0.04**	-0.02
	(0.01)	(0.01)	(0.02)	(0.05)
Observations	8,736	8,736	8,736	8,736
Municipalities	1,092	1,092	1,092	1,092
R-squared	0.919	0.920	0.919	0.919
Municipality FE	Yes	Yes	Yes	Yes
Year FE	No	No	No	No
Dept-Year FE	Yes	Yes	Yes	Yes
Controls	No	No	No	No
Mean Dep. Var.	1.604	1.604	1.604	1.604
Std. Dev. Dep. Var.	0.598	0.598	0.598	0.598

Notes: This table presents the results from our specification presented in equation 4. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. *Mines victims* is a standardized measure of the number of victims related to antipersonnel landmines between 2011 and 2014. *Forced displacement* is the number of population expelled in a municipality due to forced displacement between 2011 and 2014. *Infant mortality* is the number of deaths of children under 1 year old between 2011 and 2014 per 1,000 live births. *ETCR* is a dummy that takes the value for municipalities with Territorial Training and Reincorporation Spaces. Robust standard errors are clustered at the municipality level and presented in parenthesis. Clustered robust standard error at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table 6: Infrastructure and operation of the health sector

	(1) Antenatal care	(2) Births attended by health pro	(3) Ambulances	(4) Therapeutic support	(5) Hospital beds	(6) Medical wards
Cease × FARC	0.03**	-0.16	0.13	0.21	0.20	-0.03
	(0.01)	(0.19)	(0.10)	(0.30)	(1.24)	(0.21)
Observations	8,736	8,736	7,586	7,586	7,586	7,586
Municipalities	1092	1092	1092	1092	1092	1092
R-squared	0.924	0.861	0.941	0.737	0.968	0.883
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	5.667	96.88	2.273	0.130	21.03	1.675
Std. Dev. Dep. Var.	1.138	9.585	3.866	1.925	50.92	2.929

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation.*Ante-natal care visits* refers to the average of ante-natal care visits in the municipality per 100 live births in the municipality each year. *Births attended by health professional* is the proportion of live births that were attended by a doctors, nurses, health promoters and nursing assistants. *Ambulances* is the number of ambulances for every 1,000 inhabitants. *Therapeutic support* is the number of therapeutic chairs for every 1,000 inhabitants. *Hospital beds* is the number of hospital beds for every 1,000 inhabitants. *Medical wards* is the number of medical wards (delivery room, procedure room, and operating room) for every 1,000 inhabitants. All columns add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table 7: Neonatal and infant mortality

	(1) Neonatal mortality	(2) Infant mortality	(3) Under-5 mortality	(4)	(5)
			Overall	ADD	ARI
Cease × FARC	-0.04	-0.00	0.01	-0.86	0.84
	(0.13)	(0.27)	(0.19)	(0.53)	(1.26)
Observations	8,736	8,736	8,736	8,736	8,736
Municipalities	1092	1092	1092	1092	1092
R-squared	0.281	0.451	0.481	0.459	0.378
Municipality FE	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	7.531	25.22	16.09	3.950	12.86
Std. Dev. Dep. Var.	10.46	29.49	17.68	26.85	40.74

Notes: This table presents the results from the main specification in equation (2). *Neonatal mortality rate* refers to the number of newborns who died before 28 days of life per 1,000 live births per year. *Infant mortality rate* is the number of deaths under 1 year old per 1,000 live births per year. *Under-five mortality rate* is the number of deaths under 5 years old per 1,000 live births per year. ADD and ARI means Acute Diarrhoeal Disease and Acute Respiratory Infections, respectively. All regressions are weighted by the number of live births between 2011 to 2014. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. All columns add predetermined municipal controls interacted with the ceasefire dummy. These controls include number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index and logarithm of the population in 2010. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table 8: Newborn health

	(1) LBW	(2) APGAR 1 min	(3) APGAR 5 min	(4) Preterm birth	(5) C-Section delivery
Cease × FARC	-0.06	0.00	-0.00	-0.17	0.14
	(0.07)	(0.00)	(0.00)	(0.12)	(0.18)
Observations	8,736	7,622	7,620	7,627	7,628
Municipalities	1092	1092	1091	1092	1092
R-squared	0.563	0.829	0.779	0.649	0.929
Municipality FE	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Mean Dep. Var.	7.783	8.145	9.578	17.10	35.24
Std. Dev. Dep. Var.	4.257	0.302	0.229	5.925	14.55

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014. *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardised by the mean and standard deviation to ease interpretation. *LBW* is the percentage of newborns who weighted less than 2500 grams. *APGAR1* is the mean APGAR test after 1 minute, and *APGAR5* is after 5 minutes. *Preterm birth* corresponds to the percentage of babies who were born alive before 37 gestational weeks. *C-Section delivery* is the number of babies delivered by caesarean per 100 live births. All columns add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard error at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Online Appendix (Not for publication)

A Peace Baby Boom? Evidence from Colombia's Peace Agreement

María Elvira Guerra-Cújar, Mounu Prem, Paul Rodriguez-Lesmes and Juan F. Vargas

Data appendix: Description of variables and sources

Dependent variables. We used four different databases to create the dependent variables: The source for creating the fertility and health variables is the integrated system of the Ministry of Health and Social Protection (SISPRO) and Colombia's National Department of Statistics (DANE). The former system receives and processes data, in a single warehouse, from the institutions of the Social Protection sector: health, pensions, professional risks, and social promotion. The latter is in charge of planning, implementing, and evaluating processes for the production and communication of statistical information at the national level, which support the understanding and solution of the country's social, economic, and environmental problems and serve as a basis for the public and private decision-making.

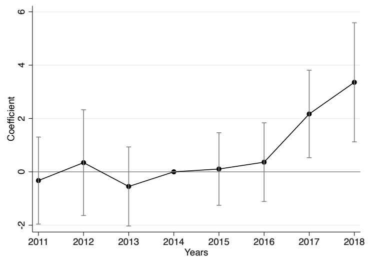
The health sector's infrastructure data is collected by the Special Register of Health Service Providers (REPS from the Spanish acronym), the official database where all health service providers in the country and their services are registered. Finally, to obtain information on marital status, we used the censuses conducted between 2005 and 2018.

The rates are computed per year at the municipal level based on the Public Health Surveillance Protocols. This guide standardizes the criteria, procedures, and activities to systematize the surveillance of events of interest in public health by the National Institute of Health (Colombia). It contains the formulas for calculating the indicators based on the criteria established by the World Health Organisation and the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD10).

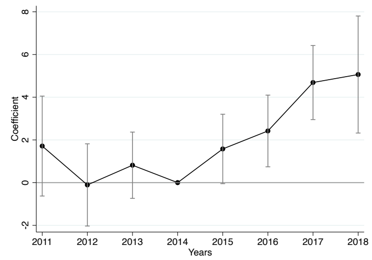
The violence dataset was originally compiled by Restrepo, Vargas, and Spagat (2004) and was updated through 2014 by Universidad del Rosario. This dataset codes violent events recorded in the Night and Fog reports from the NGO Center for Research and Popular Education (CINEP), which provides a detailed description of the violent event, its date of occurrence, the municipality in which it took place, the identity of the perpetrator, and the count of the victims involved in the incident.

Control variables and municipality characteristics. The primary source of these databases is the annual panel of Colombian municipalities, maintained and hosted by the Center For Economic Development Studies (CEDE from the Spanish acronym), a think-tank at Universidad de los Andes. Also, we use the Decontaminate Colombia database hosted by the Office of the High Commissioner for Peace, the Victim's Registry database, and the Agency for Reincorporation and Standardization database.

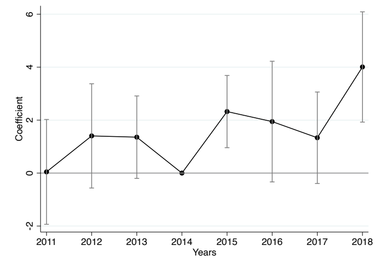
Figure A.1: Dynamic difference-in-differences for age-specific fertility rates



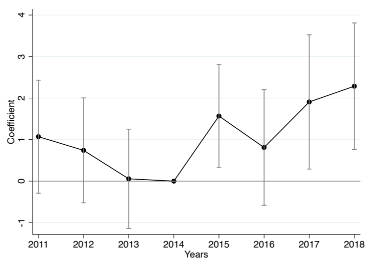
(a.1) Age between 15 and 19



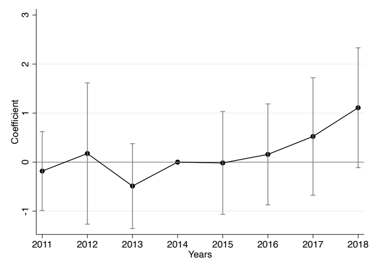
(a.2) Age between 20 and 24



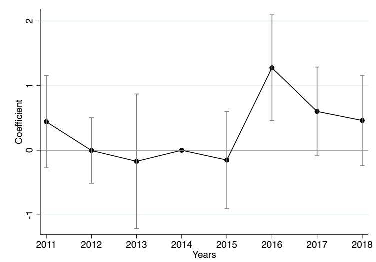
(a.3) Age between 25 and 29



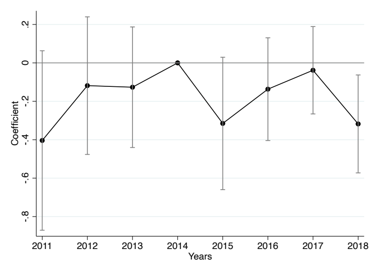
(a.4) Age between 30 and 34



(a.5) Age between 35 and 39



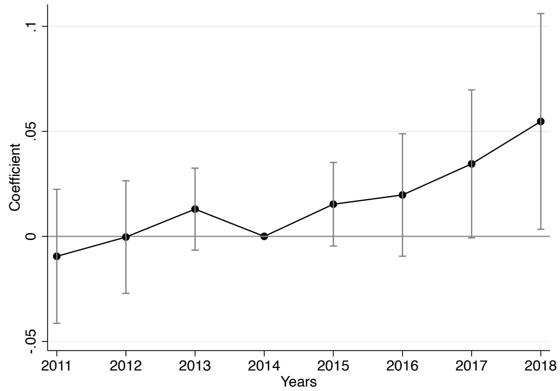
(a.6) Age between 40 and 44



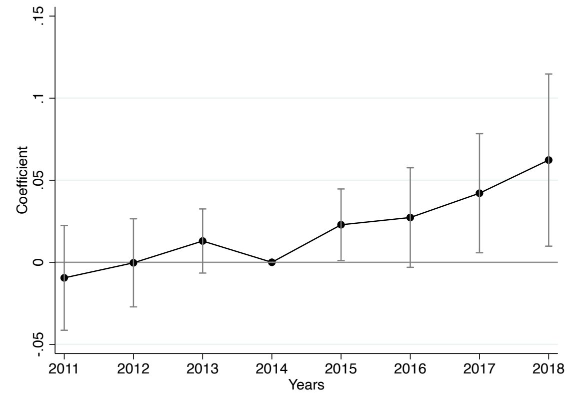
(a.7) Age between 45 and 49

Notes: These figures present the coefficients from our specification presented in equation (3). The dependent variable is age-specific fertility rates. All panels include municipality and department/year fixed effects. We present the point estimates of the regressions and the 95% confidence interval.

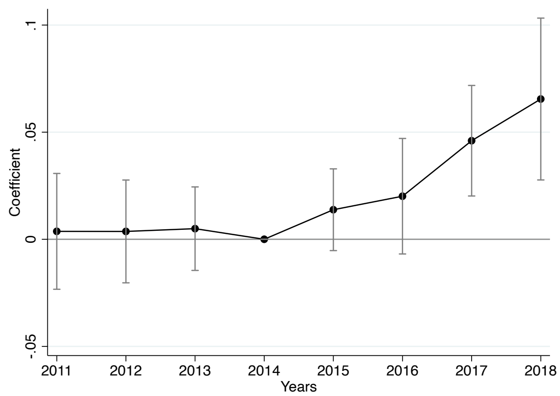
Figure A.2: Dynamic difference-in-differences for FARC measured over other time windows



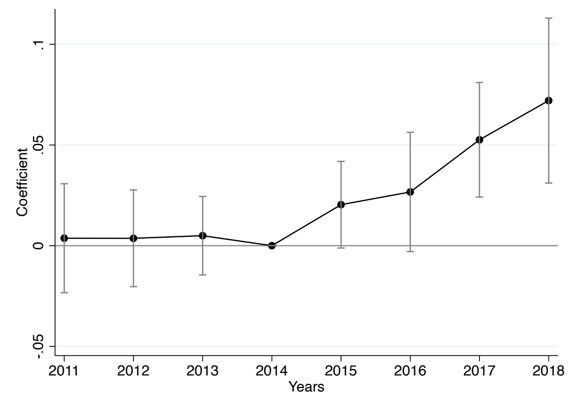
(a.1) Window 2002-2014, dept-year FE



(a.2) Window 2006-2014, dept-year FE, and controls



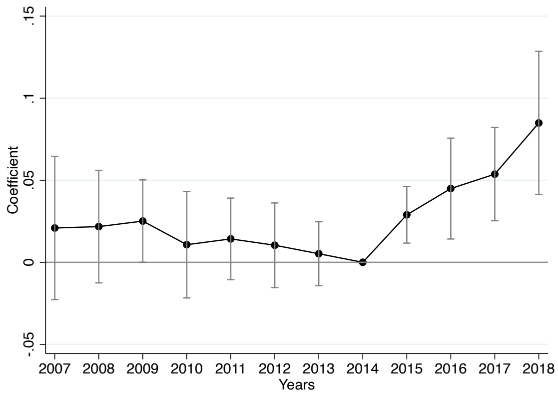
(a.3) Window 2002-2014, dept-year FE



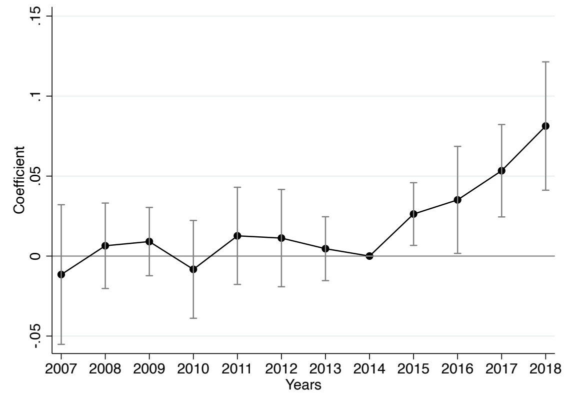
(a.4) Window 2006-2014, dept-year FE, and controls

Notes: These figures present the coefficients from our specification presented in equation (3). Panels A and B (C and D) measure FARC over the years 2002 and 2014 (2006 and 2014) All figures include municipality and department/year fixed effects, and Panels B and D add municipality characteristics interacted with time fixed effects. The dependent variable in all panels is the total fertility rate. We present the point estimates of the regressions and the 95% confidence interval.

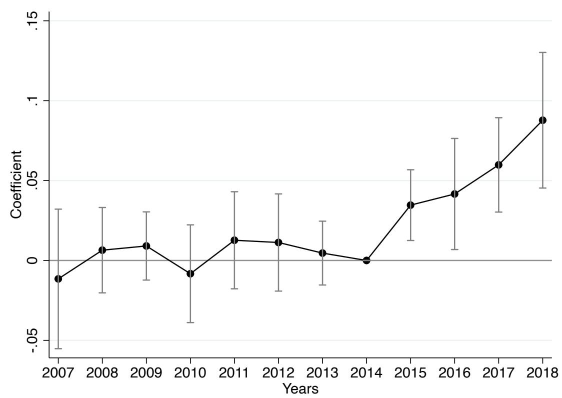
Figure A.3: Dynamic difference-in-differences for total fertility rate in an extended sample



(a.1) Includes municipality and year fixed effects



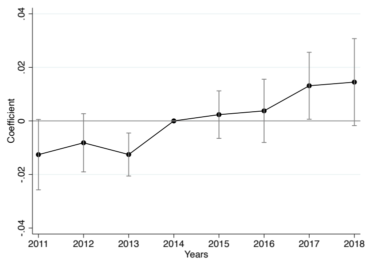
(a.2) Included municipality and department/year fixed effects



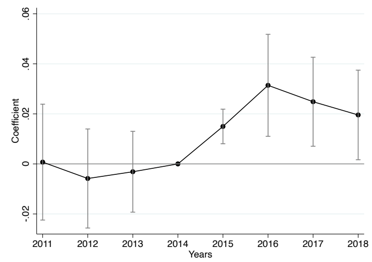
(a.3) Included municipality, department/year fixed effects, and baseline controls

Notes: These figures present the coefficients from our specification presented in equation (3), but for an extended period. Panel (a.1) includes municipality and year fixed effects, Panel (a.2) includes municipality and department/year fixed effects, Panel (a.3) includes municipality and department/year fixed effects, and baseline controls. We present the point estimates of the regressions and the 95% confidence interval.

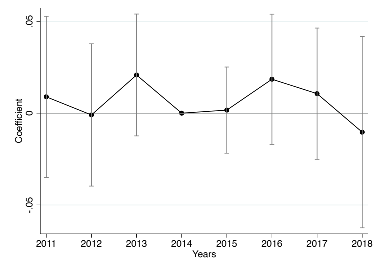
Figure A.4: Dynamic difference-in-differences for heterogeneous effects



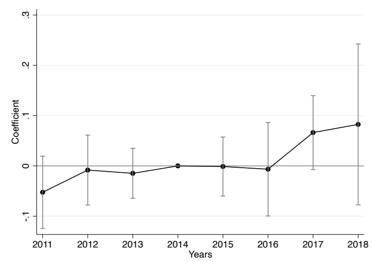
(a.1) Mines victims



(a.2) Forced displacement



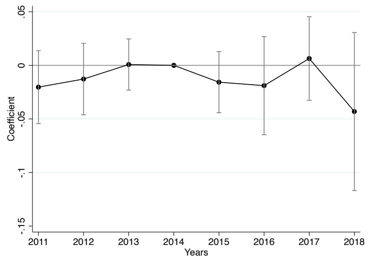
(a.3) Infant mortality



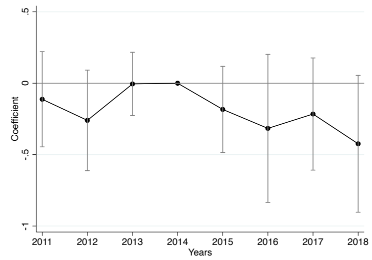
(a.4) ETCR

Notes: These figures present the coefficients from a dynamic version of the specification presented in equation (4). The dependent variable for all panels is the total fertility rate. We present the point estimates of the regressions and the 95% confidence interval.

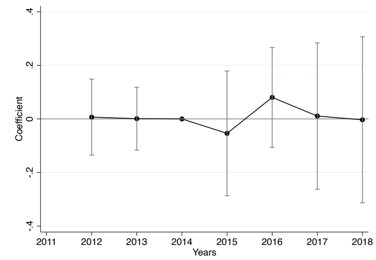
Figure A.5: Dynamic difference-in-differences for infrastructure and operation of the health sector



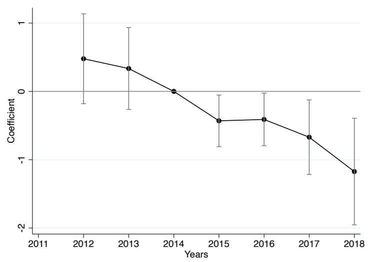
(a.1) Antenatal care visits



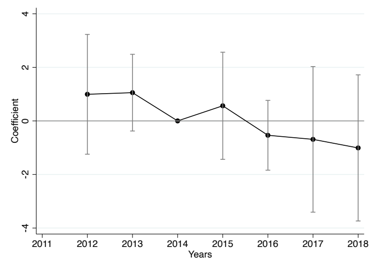
(a.2) Births attended by health professional



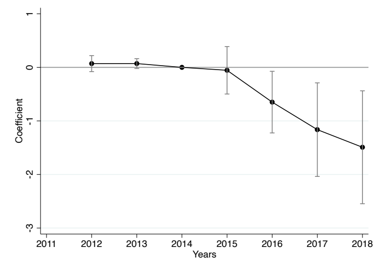
(a.3) Ambulances



(a.4) Therapeutic support



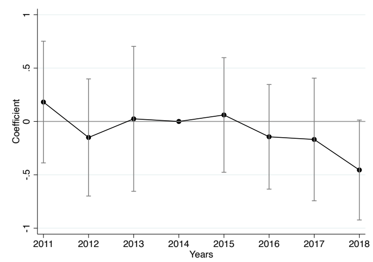
(a.5) Hospital beds



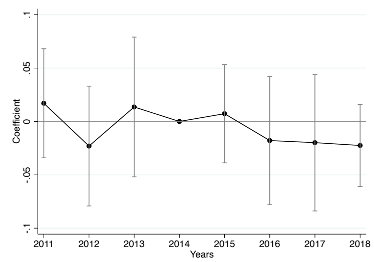
(a.6) Medical wards

Notes: These figures present the coefficients from our specification presented in equation (3). All figures include municipality and department/year fixed effects. The descriptions for each dependent variable are presented in Table 6. We present the point estimates of the regressions and the 95% confidence interval.

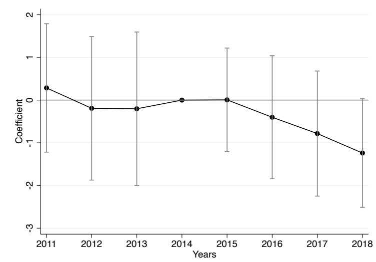
Figure A.6: Dynamic difference-in-differences for neonatal and infant mortality



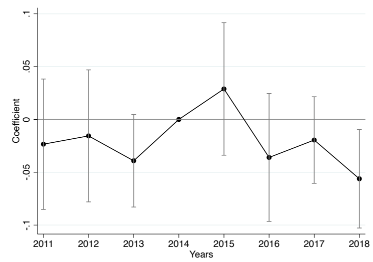
(a.1) Neonatal mortality rate



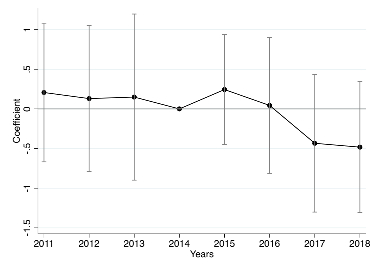
(a.2) Neonatal mortality rate above the 2015 LAC region average



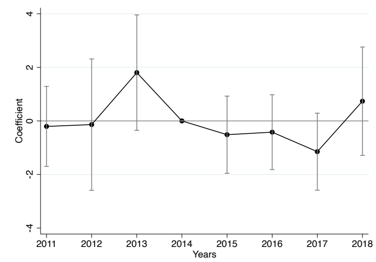
(a.3) Infant mortality rate



(a.4) Infant mortality rate above the 2015 LAC region average

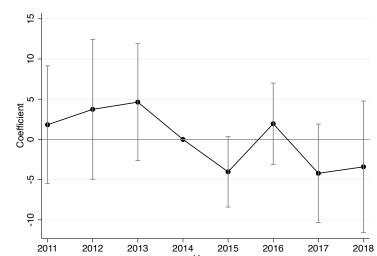


(a.5) Under-five mortality rate



(a.6) Under-five mortality rate due to acute diarrheal disease

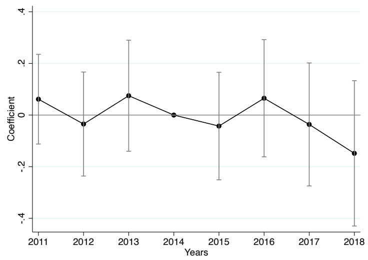
(a.7) Under-five mortality rate due to acute respiratory infection



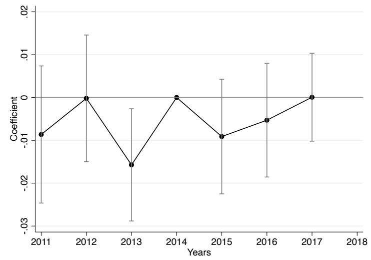
(a.8) Infectious and parasitic diseases rate

Notes: These figures present the coefficients from our specification presented in equation (3). All panels include municipality and department/year fixed effects. The descriptions for each dependent variable are presented in Table 7. We present the point estimates of the regressions and the 95% confidence interval.

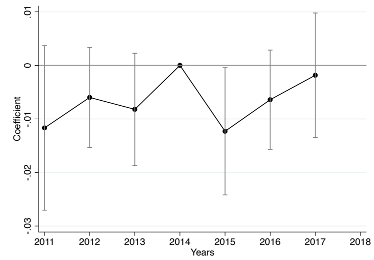
Figure A.7: Dynamic difference-in-differences for newborn health



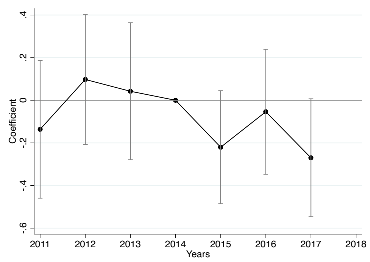
(a.1) Low birth weight



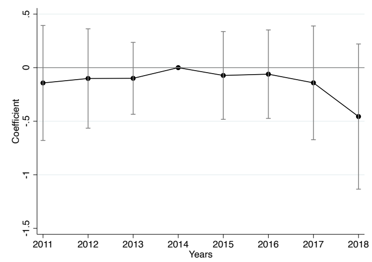
(a.2) Apgar 1 min



(a.3) Apgar 5 min



(a.4) Preterm birth



(a.5) C-Section delivery

Notes: These figures present the coefficients from our specification presented in equation (3). All figures include department/year fixed effects. The descriptions for each dependent variable are presented in Table 8. We present the point estimates of the regressions and the 95% confidence interval.

Table A.1: Variables description and sources

Variable	Description	Source
Variables: Total fertility rate and age-specific fertility rate		
Total fertility rate	Mean number of children a woman would have by age 50 if she survived to age 50 and were subject, throughout her life, to the age-specific fertility rates observed in each year. It is computed as the sum of age-specific fertility rates weighted by the number of years in each age group, divided by 1,000	SISPRO and DANE
Age-specific fertility rate	Number of live births to women in the age-group per 1,000 population of women in the same age range	SISPRO and DANE
Variables: Infrastructure and operation of the health sector		
Antenatal care visits	Average number of antenatal care visits	SISPRO and DANE
Births attended by health professional	Number of deliveries attended by doctors, nurses, health promoters and nursing assistants per 100 live births	SISPRO and DANE
Births attended by traditional midwives	Number of deliveries attended by traditional midwives or other not health professionals per 100 live births	SISPRO and DANE
Ambulances	Number of ambulances for every 1,000 inhabitants	REPS and DANE
Therapeutic support	Number of therapeutic chairs (hemodialysis chairs and chemotherapy chairs) for every 1,000 inhabitants	REPS and DANE
Hospital beds	Number of hospital beds (adult beds, neonatal care beds, pediatric beds, mental care beds, drug dependence beds, chronic patients beds, obstetrics beds, Hematopoietic steam cell transplantation beds) for every 1,000 inhabitants	REPS and DANE
Medical wards	Number of medical wards (delivery room, procedure room and operating room) for every 1,000 inhabitants	REPS and DANE

Continued on next page

Variables description and sources, continued from previous page

Variable	Description	Source
Variables: Neonatal, infant mortality and diseases		
Neonatal mortality rate	Number of deaths of babies under 28 days per 1,000 live births	SISPRO and DANE
Infant mortality	Number of deaths of children under 1 year old per 1,000 live births	SISPRO and DANE
Under-5 mortality	Number of deaths of children under 5 years old per 1,000 live births	SISPRO and DANE
Under-5 mortality ADD	Number of deaths of children under 5 years old due to acute diarrhoeal disease per 1,000 live births	SISPRO and DANE
Under-5 mortality ARI	Number of deaths of children under 5 years old due to Acute respiratory infection per 1,000 live births	SISPRO and DANE
Infectious and parasitic diseases	Number of people with diseases generally recognised as communicable or transmissible for every 1,000 inhabitants	SISPRO and DANE
Variables: Newborn health		
Low birth weight	per centage of live births with weight less than 2,500 grams	SISPRO
APGAR 1 min	Mean APGAR test after 1 minute	SISPRO
APGAR 5 min	Mean APGAR test after 5 minutes	SISPRO
Preterm birth	Number of live births who were born alive before 37 gestational weeks per 100 live births	SISPRO and DANE
C-Section delivery	Number of babies delivered by caesarean per 100 live births	SISPRO and DANE
Variables: Marriage		
Marriage	Share of the population ever married	2005 and 2018 Colombian Census

Continued on next page

Variables description and sources, continued from previous page

Variable	Description	Source
Variables: Control variables		
Rural share	per centage of the population outside the urban centre in the municipality.	CEDE, based DANE information
Distance to capital	Straight line distance to the capital of the department in which the municipality is located.	CEDE, based on Agustin Codazzi Geographic Institute information
Antipersonnel landmines victims	Standardize measure of the number of victims related to antipersonnel landmines.	Office of the High Commissioner for Peace - Decontaminate Colombia
Poverty index	per centage of the population in poverty according to the multidimensional index.	CEDE, based on DANE information
Ln population	Demographic projections based on the results of the 2005 Census and the Census Reconciliation 1985 - 2005, as well as the analyses on the behavior of the variables determining the demographic evolution.	DANE
Variables: Exposure to FARC violence		
FARC attacks	Total number of FARC attacks per 10,000 inhabitants in the municipality, from 2011 to 2014, standardised by the mean and standard deviation from 2014. Attacks are defined according to Restrepo et al., 2003: a violent event in which there is no direct, armed combat between two groups.	Restrepo et al., 2003, updated until 2014 by Universidad del Rosario

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Variables description and sources, continued from previous page

Variable	Description	Source
Variables: Municipality characteristics		
Forced displacement	Population expelled in a municipality due to forced displacement.	Victims' Registry
ETCR	Dummy that takes the value for municipalities with Territorial Training and Reincorporation Spaces, which are the places created to train the former FARC's rebels for their reincorporation into civil life.	Agency for Reincorporation and Standardization

Table A.2: Test for differential pre-trends

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ASFR for women aged between:							
	TFR	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Antenatal care visits
Linear trend × FARC	-0.00	0.01	-0.40	0.00	-0.36*	0.01	-0.17*	0.04	0.01
	(0.00)	(0.29)	(0.38)	(0.30)	(0.21)	(0.14)	(0.10)	(0.03)	(0.01)
Observations	4,368	4,368	4,354	4,354	4,354	4,354	4,354	4,354	4,368
R-squared	0.945	0.899	0.922	0.892	0.858	0.798	0.671	0.431	0.946
Panel B									
		Neonatal mortality		Infant mortality		Under-5 mortality			Population
	Births attended by health prof	Overall	Above 10	Overall	Above 18	Overall	ADD	ARI	Infectious, parasitic diseases
Linear trend × FARC	0.06	-0.04	-0.00	-0.09	0.00	-0.06	0.26	0.28	-0.46
	(0.06)	(0.10)	(0.01)	(0.25)	(0.01)	(0.15)	(0.30)	(0.42)	(1.17)
Observations	4,354	4,368	4,368	4,368	4,368	4,368	4,368	4,368	4,368
R-squared	0.923	0.360	0.411	0.451	0.419	0.517	0.494	0.485	0.797
Panel C									
	New born health					Infrastructure and operation of the health sector			
	LBW	APGAR 1 min	APGAR 5 min	Preterm birth	C-Section delivery	Ambulances	Therapeutic support	Beds	Medical wards
Linear trend × FARC	-0.01	0.00	0.00	0.04	0.04	-0.00	-0.24	-0.50	-0.03
	(0.03)	(0.00)	(0.00)	(0.06)	(0.09)	(0.04)	(0.17)	(0.57)	(0.04)
Observations	4,368	4,349	4,347	4,353	4,354	3,129	3,129	3,129	3,129
R-squared	0.643	0.868	0.832	0.714	0.943	0.983	0.522	0.980	0.978
Municipalities	1092	1089	1088	1090	1090	1049	1049	1049	1049
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results from a regression in the pre-ceasefire period (2011-2014) where the coefficient of interest is the interaction between a linear trend and FARC, and we include municipality and department-year fixed effects. All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. The dependent variables are the ones presented in Tables 3, 4, 6, 7, and 8. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table A.3: Placebo treatment in 2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A									
		ASFR for women aged between:							
	TFR	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Antenatal care visits
Placebo × FARC	-0.01	0.23	-1.39	0.92	-0.75	-0.00	-0.56**	0.14*	0.02
	(0.01)	(0.76)	(1.01)	(0.78)	(0.48)	(0.31)	(0.25)	(0.08)	(0.01)
Observations	4,368	4,368	4,354	4,354	4,354	4,354	4,354	4,354	4,368
R-squared	0.945	0.899	0.922	0.892	0.858	0.798	0.671	0.431	0.946
Panel B									
		Neonatal mortality		Infant mortality		Under-5 mortality			Population
	Births attended by health prof	Overall	Above 10	Overall	Above 18	Overall	ADD	ARI	Infectious, parasitic diseases
Placebo × FARC	0.02	-0.22	-0.02	-0.42	0.01	-0.11	0.76	-0.45	0.97
	(0.13)	(0.29)	(0.03)	(0.80)	(0.02)	(0.46)	(0.79)	(1.17)	(2.44)
Observations	4,354	4,368	4,368	4,368	4,368	4,368	4,368	4,368	4,368
R-squared	0.923	0.360	0.411	0.451	0.419	0.517	0.494	0.485	0.797
Panel C									
	New born health								
	LBW	APGAR 1 min	APGAR 5 min	Preterm birth	C-Section delivery				
Placebo × FARC	-0.05	0.00	0.01	0.18	0.07				
	(0.07)	(0.01)	(0.01)	(0.13)	(0.22)				
Observations	4,368	4,349	4,347	4,353	4,354				
R-squared	0.643	0.868	0.832	0.714	0.943				
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (2), but restricting the sample to the pre-ceasefire period (2011-2014). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Placebo* is a dummy that takes the value for the years 2012, 2013, and 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. The dependent variables are the ones presented in Tables 3, 4, 6, 7, and 8. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table A.4: Placebo treatment in 2013

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ASFR for women aged between:							
	TFR	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Antenatal care visits
Placebo × FARC	-0.01	-0.29	-0.36	-0.00	-0.85*	-0.11	-0.33	0.07	0.02
	(0.01)	(0.67)	(0.79)	(0.63)	(0.44)	(0.40)	(0.25)	(0.08)	(0.01)
Observations	4,368	4,368	4,354	4,354	4,354	4,354	4,354	4,354	4,368
R-squared	0.945	0.899	0.922	0.892	0.858	0.798	0.671	0.431	0.946
Panel B									
		Neonatal mortality		Infant mortality		Under-5 mortality			Population
	Births attended by health prof	Overall	Above 10	Overall	Above 18	Overall	ADD	ARI	Infectious, parasitic diseases
Placebo × FARC	0.18	-0.00	0.01	-0.15	-0.00	-0.09	1.07	1.20	-0.46
	(0.13)	(0.25)	(0.02)	(0.55)	(0.03)	(0.32)	(1.00)	(1.19)	(2.43)
Observations	4,354	4,368	4,368	4,368	4,368	4,368	4,368	4,368	4,368
R-squared	0.923	0.360	0.411	0.451	0.419	0.517	0.495	0.485	0.797
Panel C									
	New born health					Infrastructure and operation of the health sector			
	LBW	APGAR 1 min	APGAR 5 min	Preterm birth	C-Section delivery	Ambulances	Therapeutic support	Beds	Medical wards
Placebo × FARC	0.02	-0.00	0.00	0.04	0.07	-0.01	-0.31	-0.47	-0.03
	(0.06)	(0.00)	(0.01)	(0.13)	(0.20)	(0.06)	(0.19)	(0.96)	(0.07)
Observations	4,368	4,349	4,347	4,353	4,354	3,129	3,129	3,129	3,129
R-squared	0.643	0.868	0.832	0.714	0.943	0.983	0.521	0.980	0.978
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (2), but restricting the sample to the pre-ceasefire period (2011-2014). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Placebo* is a dummy that takes the value for the years 2013 and 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. The dependent variables are the ones presented in Tables 3, 4, 6, 7, and 8. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table A.5: Placebo treatment in 2014

Panel A	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		ASFR for women aged between:							
	TFR	15-19	20-24	25-29	30-34	35-39	40-44	45-49	Antenatal care visits
Placebo × FARC	-0.01	0.21	-0.81	-0.91	-0.53	0.21	-0.11	0.05	0.01
	(0.01)	(0.72)	(0.83)	(0.78)	(0.55)	(0.38)	(0.30)	(0.09)	(0.01)
Observations	4,368	4,368	4,354	4,354	4,354	4,354	4,354	4,354	4,368
R-squared	0.945	0.899	0.922	0.892	0.858	0.798	0.671	0.431	0.946
Panel B									
		Neonatal mortality		Infant mortality		Under-5 mortality			Population
	Births attended by health prof	Overall	Above 10	Overall	Above 18	Overall	ADD	ARI	Infectious, parasitic diseases
Placebo × FARC	0.13	-0.02	-0.00	0.04	0.03	-0.16	-0.49	0.76	-3.40
	(0.13)	(0.23)	(0.02)	(0.67)	(0.03)	(0.39)	(0.62)	(0.87)	(3.58)
Observations	4,354	4,368	4,368	4,368	4,368	4,368	4,368	4,368	4,368
R-squared	0.923	0.360	0.411	0.451	0.419	0.517	0.494	0.485	0.797
Panel C									
	New born health					Infrastructure and operation of the health sector			
	LBW	APGAR 1 min	APGAR 5 min	Preterm birth	C-Section delivery	Ambulances	Therapeutic support	Beds	Medical wards
Placebo × FARC	-0.03	0.01	0.01*	-0.00	0.12	-0.00	-0.41	-1.02	-0.07
	(0.09)	(0.01)	(0.00)	(0.13)	(0.19)	(0.06)	(0.32)	(0.84)	(0.05)
Observations	4,368	4,349	4,347	4,353	4,354	3,129	3,129	3,129	3,129
R-squared	0.643	0.868	0.832	0.714	0.943	0.983	0.522	0.980	0.978
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table presents the results from the main specification in equation (2), but restricting the sample to the pre-ceasefire period (2011-2014). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Placebo* is a dummy that takes the value for the year 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. The dependent variables are the ones presented in Tables 3, 4, 6, 7, and 8. Clustered robust standard errors at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table A.6: Total fertility rate and ceasefire: Weights and continuous treatment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Weighted						Unweighted					
	Continuous measure			Discrete measure			Continuous measure			Discrete measure		
Cease × FARC	0.04***	0.04***	0.04***	0.05	0.07**	0.08*	0.03*	0.03*	0.03*	0.07***	0.06**	0.07**
	(0.01)	(0.01)	(0.01)	(0.04)	(0.03)	(0.04)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Observations	8,736	8,736	8,736	8,736	8,736	8,736	8,736	8,736	8,736	8,736	8,736	8,736
Municipalities	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092
R-squared	0.899	0.919	0.921	0.898	0.919	0.921	0.858	0.876	0.877	0.858	0.875	0.876
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
Dept-Year FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Controls	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes
Mean Dep. Var.	1.551	1.551	1.551	1.551	1.551	1.551	1.551	1.551	1.551	1.551	1.551	1.551
Std. Dev. Dep. Var.	0.598	0.598	0.598	0.598	0.598	0.598	0.598	0.598	0.598	0.598	0.598	0.598

Notes: This table presents the results from the main specification in equation (2). *Cease* is a dummy that takes the value for the period after 2014. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation; and a discrete measure if there was at least one violent case by FARC in the same period mentioned before. Columns 3, 6, 9 and 12 add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard error at the municipality level is in parenthesis, *p is significant at the 10% level, **p is significant at the 5% level, ***p is significant at the 1% level.

Table A.7: Different time windows for measuring FARC

	(1)	(2)	(3)	(4)
	FARC measured over:			
	2002-2014		2006-2014	
Cease × FARC	0.03**	0.04**	0.03**	0.04***
	(0.02)	(0.02)	(0.01)	(0.01)
Observations	8,736	8,736	8,736	8,736
R-squared	0.919	0.921	0.919	0.921
Municipality FE	Yes	Yes	Yes	Yes
Dept-Year FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Municipalities	1092	1092	1092	1092
Mean Dep. Var.	1.606	1.606	1.606	1.606
Std. Dev. Dep. Var.	0.596	0.596	0.596	0.596

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Cease* is a dummy that takes the value for the period after 2014. In columns 1 and 2 (3 and 4) *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2002 to 2014 (2006 to 2014), and is standardized by the mean and standard deviation to ease interpretation. Columns 2 and 4 add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard error at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.

Table A.8: Differential effects after implementation

	(1)	(2)	(3)
	Total Fertility Rate		
Implementation × FARC	0.03***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)
Cease × FARC	0.03**	0.02**	0.03**
	(0.01)	(0.01)	(0.01)
Observations	8,736	8,736	8,736
R-squared	0.899	0.920	0.922
Municipality FE	Yes	Yes	Yes
Dept-Year FE	No	Yes	Yes
Controls	No	No	Yes
Municipalities	1092	1092	1092
Mean Dep. Var.	1.564	1.564	1.564
Std. Dev. Dep. Var.	0.594	0.594	0.594

Notes: This table presents the results from the main specification in equation (2). All regressions are weighted by the number of live births between 2011 to 2014 for each age group. *Cease* is a dummy that takes the value for the period after 2014, while *Implementation* is a dummy that takes the value one for 2017 and 2018. *FARC* is a continuous measure of the total number of FARC attacks over 10,000 inhabitants from 2011 to 2014, and is standardized by the mean and standard deviation to ease interpretation. Column 3 adds predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard error at the municipality level are presented in parenthesis. *p is significant at the 10% level, **p is significant at the 5% level, ***p is significant at the 1% level.

Table A.9: Marriage

	(1)	(2)	(3)	(4)	(5)	(6)
	All		Between 18 and 29		Between 30 and 49	
Cease × FARC	0.004	0.005	-0.003	0.005	0.005	0.003
	(0.007)	(0.005)	(0.008)	(0.005)	(0.006)	(0.006)
Observations	2,166	2,166	2,166	2,166	2,166	2,166
R-squared	0.874	0.909	0.895	0.928	0.861	0.894
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Department-Year FE	No	Yes	No	Yes	No	Yes
Mean Dep. Var.	0.521	0.521	0.334	0.334	0.716	0.716
Std. Dev. Var.	0.050	0.050	0.061	0.061	0.055	0.055

Notes: This table presents the results from the main specification in equation (2), but using data from the 2005 and 2018 Census. The dependent variable is the share of the population ever married. Columns 1 and 2 show the results for people between 18 and 49 years old, columns 3 and 4 for people between 18 and 29 years old, and columns 5 and 6 for people between 30 and 49 years old. *Cease* is a dummy that takes the value for the period after 2014. *FARC* a dummy variable that takes the value one if there was at least one violent case by FARC. All columns add predetermined municipal controls interacted with the ceasefire dummy. These controls include infant mortality rate, number of victims related to anti-personnel mines, share of rural population, distance to the department capital, poverty index, and logarithm of the population in 2010. Clustered robust standard error at the municipality level are presented in parenthesis. **p* is significant at the 10% level, ***p* is significant at the 5% level, ****p* is significant at the 1% level.