The Remarkable Stability of Fertility Desires during the Colombian Armed Conflict 2000–2016

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Abstract

Limited attention has been paid so far to the impacts of war on proximate determinants of fertility, including childbearing preferences. This study explores the relationship between exposure to local conflict violence and fertility desires in Colombia. I combined nationally representative micro-level data from the Demographic and Health Surveys on the timing, frequency and decisiveness of reproductive preferences, with geospatial information about local violence from the Uppsala Conflict Data Program from 2000 to 2016. The results show a remarkable stability in women's childbearing desires in relation to conflict during the observation period, robust to multiple re-specifications of the study sample, statistical model and conflict measurements. The study indicates that previously reported increases to fertility behavior cannot be explained by altered preferences, suggesting a surge in unwanted pregnancies. This highlights the need for policy programs to support women in realizing their fertility preferences, whatever they may be.

Keywords: Fertility preferences; armed conflict; reproductive health; Colombia

Introduction

Changed fertility behavior has been observed in multiple settings of armed conflict with very mixed results, but limited attention has been paid to the proximate determinants of fertility. Without knowledge about how exposure to war links to desires and ideals, it is impossible to ascertain whether (non-)births were a result of preferences, or if conflict impedes the possibility to make free reproductive choices. Observing women's fertility desires during armed conflict indicates how a violent social context may shape both subsequent childbearing behavior as well as constraints of women's reproductive agency. These insights can shed light on future trends in fertility and the social determinants of fertility behavior.

This study explores to what extent local armed conflict violence has influenced childbearing desires, in terms of timing, frequency and decisiveness. I focus on the case of Colombia, where previous research has observed a positive fertility response to local conflict in Colombian rural areas 2000–2010, hypothesized by the authors as reflecting higher mortality levels and reduced access to health care and protection (Castro Torres & Urdinola, 2018). Although these mechanisms are plausible, it may also be the case that fertility control may have been compromised by the conflict. One way of ascertaining whether a fertility increase is due to changes in unintended births or demand is to explore whether fertility preferences are sensitive to conflict. There is only one study to the author's knowledge that has quantitatively addressed fertility preferences; women's preferences for ideal number of children were higher after the genocide in Rwanda compared to before (Rutayisire et al., 2013). While the so-called substitution effect is well-researched in the Rwandan setting, there is no knowledge on this topic from the Colombian conflict. To the best of my knowledge, no previous studies have empirically measured violent conflict in relation to fertility preferences.

Colombia provides an interesting case study, with a unique history of long-term conflict that has varied substantially in intensity over space and time. Colombia's history of protracted conflict may have shaped fertility preferences in the long run, more than in places such as Rwanda where violence has been more of a shock. Additionally, the ongoing peace process has had an unprecedented focus on the particular impact of war on women, above all in terms of sexual violence. But many other aspects of women's reproductive health and rights have remained outside of the attention of policy and research. Finally, Colombia is one of few conflict settings where data collection has continued without interruption.

I focus exclusively on women's preferences due to the lack of comparable data on men, while recognizing that fertility ideals are often interrelated within couples, due to both homogamy and convergence over time (Thomson, 1997; Yeatman & Sennott, 2014). I use the terms fertility desires, wants and preferences interchangeably, but distinct from fertility intentions, plans or expectations (Casterline & El-Zeini, 2007; Miller, 2011; Schaeffer & Thomson, 1992; Thomson, 1997; Trent, 1980). The present study focuses solely on fertility desires, not whether or not those desires were subsequently realized. Reproductive preferences may be prevented from realization because of unforeseen events such as contraceptive failure, subfecundity, miscarriage, or stillbirth. The decision to act on preferences may be influenced by others, such as a partner or parents and in-laws. Experiencing the birth or death of a child can affect desires, including ex-post rationalizations of whether births were wanted. Additionally, genuine changes can occur if the preferences are not strongly held (Bankole & Westoff, 1998; Casterline & El-Zeini, 2007; Thomson, 1997; Thomson et al., 1990; Thomson & Brandreth, 1995; Yeatman et al., 2020).

Conflict may also produce additional challenges, such as economic losses, health care system disruption, displacement, physical injury and death. Conflict may lead to women having

fewer live children and/or at another time than they want due to higher rates of pregnancy loss, child mortality, and reduced sexual activity. Conversely, women may end up having unwanted or mistimed births due to lack of access to or failure in contraception and abortion and victimization to conflict-related sexual violence (Casey et al., 2013; Casey & Tshipamba, 2017; Kreft, 2019, 2020; Orach et al., 2015; Svallfors & Billingsley, 2019). We therefore cannot expect a strong correspondence between preference, intention and outcome. Nevertheless, the study can shed light on what proximate determinants matter for fertility behavior.

Conflict and fertility desires

The below framework assumes that life course experiences – including facing violence of war – create new costs and benefits to having children, thus causing context-dependent fluctuations in fertility desires over time (Debpuur & Bawah, 2002; Hayford, 2009; Heiland et al., 2008; Iacovou & Tavares, 2011; Kodzi et al., 2010; Kuhnt et al., 2017; Liefbroer, 2009; Máire Ní Bhrolcháin et al., 2010; Maire Ní Bhrolcháin & Beaujouan, 2019; Ray et al., 2018; Sennott & Yeatman, 2012; Yeatman et al., 2013). Based on the literature, changes in preferences manifest in increases and decreases to the tempo and quantum of childbearing, and the decisiveness of those preferences could be either reinforced or weakened. Given how past research shows a fertility increase related to conflict, we would expect to see increases in fertility preferences. But I will also discuss the opposite direction since effects could be heterogeneous.

Wanting More Children

Since conflict leads to death and displacement, women might want more children to replace lost family, children and community (Chi et al., 2015b, 2015a; Kraehnert et al., 2019; Torrisi, 2020b). This so-called substitution effect is well-documented in Rwanda, where women's preferences for ideal number of children were higher after the genocide compared to before (Rutayisire et al., 2013). Conflict may also break up relationships, which could result in re-partnering and parity progression to "confirm" the new relationship (Schmeer & Hays, 2017; Vikat et al., 1999). In the long-term, lower educational attainment due to war may reorient women's activities from labor market to family and diminish the opportunity costs of having children (Becker, 1981; Berrington & Pattaro, 2014; Islam et al., 2016).

Women's tempo preferences regarding childbearing may be altered, if women want to conceive children early because of high levels of morbidity, mortality and conscription among young men. Anticipating the death of a partner may increase the urgency to have children earlier rather than later (Jok, 1999; Navarro Valencia, 2009). The substitution effect may also be relevant for the tempo of childbearing, if women feel a need to hastily replace lost ones.

Hypothesis 1a: Exposure to local conflict is linked to a desire for a *higher* number of children.

Hypothesis 1b: Exposure to local conflict is linked to a desire for having children *sooner*.

Wanting Fewer Children

Conversely, women faced with conflict may want to postpone or reduce births because of deteriorating social conditions. Those negative turns include loss of security, family, relationships and social support as described above. Additionally, poverty (Ibáñez & Moya, 2010), housing shortages, skewed sex ratios (Khlat et al., 1997), and postponement of marriage (Blanc, 2004; Sánchez-Barricarte, 2018; Torrisi, 2020a) may shift women's preferences away from childbearing.

Health system failures may reduce access to services such as antenatal visits, assisted delivery and child vaccination (Balinska et al., 2019; Leone et al., 2018; Østby et al., 2018)[1]. Difficulties in predicting access to health care may lead to fertility postponement or stopping, if women feel the health of their children or themselves could be at risk.

Hypothesis 2a: Exposure to local conflict is linked to a desire for a *lower* number of children.

Hypothesis 2b: Exposure to local conflict is linked to a desire for having children *later*.

Decisiveness and Risk

Conflict may cause changes to relationships, economic prospects, health that in turn could create decisiveness or ambivalence related to childbearing (Sennott & Yeatman, 2018).

Childbearing desires are not isolated in the life world, but connect to the understanding of oneself and others, present circumstances, and future possibilities. Fertility preferences, intentions and behavior may be a way of grasping for responsibility and control in a wider context of constrained agency due to conflict, not least when the prospects for one's children become limited (Dalsgaard, 2004, 2005). Social networks as well as anticipation of regret may guide decision-making in terms of risk perception (Montgomery, 2000).

Political violence is often used strategically to instill fear in civilians, which in turn relates to how individuals perceive and calculate risk. The literature from economic and psychological research on risk perception following violent conflict and natural catastrophes offer mixed evidence. Some studies have found that individuals become more risk-averse (Cameron & Shah, 2014; Cassar et al., 2017; Kim & Lee, 2014; Sacco et al., 2003); while others, more risk-tolerant (Eckel et al., 2009; Voors et al., 2012). Several studies suggest that post-crisis risk attitudes vary by gender, as women express more risk-averse preferences than men (Hanaoka et al., 2018; Lerner et al., 2003; Weber et al., 2002).

Altered life circumstances and perceived risk may change how women deem their situation and thus their decisiveness around childbearing preferences (Dommermuth et al., 2011). However, it is not evident a priori which direction the pattern of the relationship may go, thus yielding two opposing hypotheses.

Hypothesis 3a: Exposure to local conflict is linked to being *more* decided regarding fertility preferences.

Hypothesis 3b: Exposure to local conflict is linked to being *less* decided regarding fertility preferences.

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[1] Conflict may also, however, increase women's seeking reproductive health services (Howard et al., 2011; Torche & Villarreal, 2014).

Births and Deaths in Colombia

Colombia has had an unusually longstanding internal armed conflict since the mid-1960s involving the government, paramilitary groups, organized crime groups, and left-wing guerrillas. The conflict has its roots in the governmental vacuum in remote geographic areas, clientelism and corruption, socioeconomic injustice, and political exclusion. Over the years, it has grown ever more complex through the widespread illicit trade of drugs and arms and judicial impunity (Bergquist et al., 2001). Widespread violence in the forms of homicides, disappearances, forced displacements, use of antipersonnel mines, and kidnapping has seriously affected of the Colombian people (Alzate, 2008; Franco et al., 2006; Garfield & Llanten Morales, 2004). Homicide rates vary substantially across the country, representing the level of regional state presence. Most Colombians have family or friends who were murdered, kidnapped, displaced or disappeared in the war, which has killed around 200,000 people and displaced millions (Franco et al., 2006).

As for fertility dynamics, the two-child norm is firmly established in Colombia (Paz-Gómez, 2010) and the majority of women want one child of each sex. Given the small portion of reproductive years needed to bear two children, this means that the average Colombian woman will be at risk of unwanted pregnancies for 20 or more years between menarche and menopause if she is sexually active (Bongaarts & Casterline, 2018, p. 801). The total fertility rate is one of the lowest in Latin America, at around 2.0 children per woman, following a fertility transition from high to low birth rates that was one of the fastest recorded in history. The adolescent fertility rate has fluctuated over the decades, from 99 live births per 1,000 female adolescents in 1969, 70 in 1990, 90 in 2005, and then at 74 in the latest DHS survey round. Of those interviewed in 2015/2016, about 17.4 percent of women aged 13–19 were pregnant with their first child or had already become mothers. Adolescent fertility has been concentrated in women in the countryside with low levels of education and household wealth (DHS, 2017). The early transition to motherhood exists alongside postponement of second births. Since the 1990s, norms have evolved into later transitions to motherhood for women from all educational backgrounds. Afro-Colombian women transition into first birth earlier than women from other ethnicities. Afro-Colombian and indigenous women have shorter intervals between first and second birth (Batyra, 2016).

Like most aspects of human activity, the Colombian armed conflict has also affected fertility dynamics. At the population level, the rapid fertility transition in Colombia during the 1960s from seven to four children on average per woman may have been driven in part by conflict-related migration from rural to urban areas (Potter et al., 1976). If this is true, women's fertility preferences may have been altered towards later and fewer, compared to previous generations. As previously mentioned, Castro Torres and Urdinola (2018) found a positive fertility response to local violence in Colombian rural areas during 2000–2010, hypothetically reflecting higher mortality levels and reduced access to health care and protection. However, the authors did not empirically investigate the mechanism behind their finding. Svallfors and Billingsley (2019) found that conflict reduced the probability of using reversible modern contraception, partially because women want more children soon, which may reflect a replacement effect or union uncertainty. But it is also likely that the health care system failure decreased reversible contraceptive use. Svallfors (2020) reported a positive relationship between local conflict and uptake in female sterilizations, the only contraceptive method that represents an irreversible stop to women's childbearing, with suggestive evidence of women choosing the most reliable option when access to reversible contraception becomes more unstable.
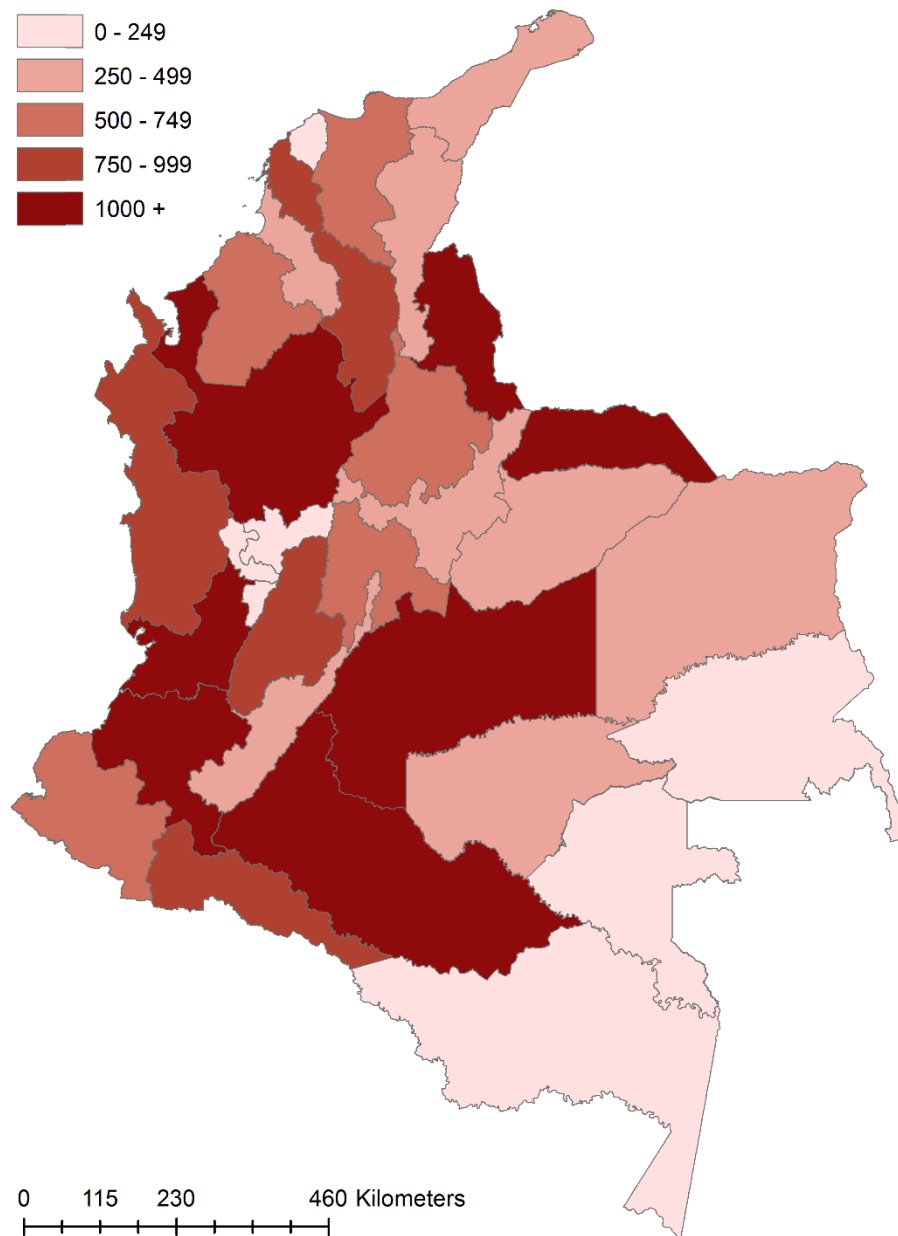
Figure 1. Distribution of violent deaths in Colombia's departments 1989–2016

Analytical procedure

Two sets of data are combined in this study to explore reproductive empowerment and desires in the Colombian armed conflict.

The dependent variables as well as sociodemographic control variables are collected from four pooled rounds of the Colombian Demographic and Health Surveys (DHS), conducted every fifth year from 2000 to 2015, which offer cross-sectional information on women's reproductive desires and individual characteristics. Response rates were above 86 percent in all rounds (DHS, 2000, 2005, 2011, 2017).

The independent variables capturing exposure to local violence were created from the Uppsala Conflict Data Program (UCDP), which contains data from 1989 to 2016 about events of violent conflict in which at least one person was killed, including when and where

each event occurred and an estimation of how many casualties there were (Croicu & Sundberg, 2017; Sundberg & Melander, 2013). The conflict data is illustrated in Figure 1, where departments with more conflict deaths are marked with darker colors.

Variables
Given how conflict may hypothetically have either positive or negative effects on women's preferences around the tempo and quantum of childbearing, as well as the degree of decisiveness around those preferences, it is reasonable to address fertility preferences using indicators that capture the range of these aspects. There are two focal dependent variables in this study. *Desire for children* measures whether the respondent wants more children within two years, after two years[2], is unsure of timing, is undecided, or wants no more children[3]. *Ideal number of children* measures the number of children the respondent considers as the ideal family size: zero, one, two, three, four or above[4]. Multiple re-specifications to the dependent variables are described in the section "Alternative analyses" below.

The conflict data are merged to individual women spatially by the geographic division in which the respondent resided at the time of interview and the conflict events occurred, and temporally by different timeframes. Akaike's Information Criterion (AIC) was used to assess which specification yields the best statistical model fit, depending on geographic level (department or municipality), time (one, three or five year(s) before interview measured in months), functional form (linear, categorical or binary), and definition of conflict (battle events or casualties).

A linear measure of battle events in the department with a one-year time lag provided the best model fit overall. This focal independent variable improved model fit most according to AIC. Results from the other conflict indicators will be discussed in the alternative analyses section.

Sociodemographic characteristics captured at time of interview are included as control variables: *age*, *household wealth index quintiles*, *type of place of residence*, *highest level of education*, and *relationship status*[5].

Sample selection
The sample selection consists of Colombian women aged 13–49 who were not pregnant, sterilized or infecund, since these are the ones that may arguably adjust their fertility preferences. In models of ideal family size, childless women are an important selection since we might expect ex-post rationalizations or justification mechanisms of women with children. A total of 46,639 women were included in this sub-sample. In models of desire for children, 100,411 women with and without children were included in the sample.

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[2] This category also included women who wanted more but were uncertain of when, as fertility intentions after two years are unreliable (Thomson & Brandreth, 1995).
[3] The questionnaire asks: "Would you like to have another child or would you prefer to not have more children? How much time would you like to wait before the birth of another child?"
[4] Women with children are asked: "If you could return to the time before you had children and choose exactly how many children you could have in all of your life, how many would they be?" Women without children are asked "If you could choose exactly the number of children you would have in all your life, how many would they be?" See the alternative analyses section for a robustness check on only childless women.
[5] Distinguishing between never in union, partnered (married or cohabiting) and formerly partnered (divorced, separated, living apart, or widowed).

Descriptive statistics of the characteristics of the sample populations are displayed in Tables 1 and 2.

Table 1. Descriptive statistics of women with and without children

	Frequency	Mean	Standard deviation	Minimum	Maximum
Conflict events in the past year	100,411	30.96	56.94	0	386
	Frequency	**Percent**			
Desire for children					
Wants more within two years	11,750	12%			
Wants more after two years or unsure timing	48,414	48%			
Undecided	2,991	3%			
Wants no more	37,256	37%			
Survey round					
2000	7,833	7%			
2005	29,499	30%			
2010	36,980	37%			
2015	26,099	26%			
Age					
13–19	33,362	33%			
20–24	18,792	19%			
25–29	14,977	15%			
30–34	11,461	11%			
35–39	8,908	9%			
40–44	7,145	7%			
40–49	5,766	6%			
Residence					
Urban	75,438	75%			
Rural	24,973	25%			
Highest level of education					
Primary or lower	22,131	22%			
Secondary	55,903	56%			
Tertiary	22,377	22%			
Househould wealth index quintiles					
Lowest	22,469	22%			
Secondary	25,641	26%			
Middle	21,434	21%			
Fourth	17,315	17%			
Highest	13,552	14%			
Working					
No	54,491	54%			
Yes	45,920	46%			
Relationship status					
Never in union	41,205	48%			
Partnered	4,191	40%			
Formerly partnered	1,243	13%			
Total	**100,411**	**100%**			

Table 2. Descriptive statistics of women without children

	Frequency	Mean	Standard deviation	Minimum	Maximum
Conflict events in the past year	46,639	29.90	55.44	0	386

	Frequency	Percent
Ideal number of children		
0	2,870	6%
1	8,300	18%
2	28,528	61%
3	5,489	12%
4+	1,452	3%
Survey round		
2000	3,287	7%
2005	13,791	30%
2010	17,264	37%
2015	12,297	26%
Age		
13–19	29,441	63%
20–24	8,817	19%
25–29	3,940	8%
30–34	1,938	4%
35–49	2,503	5%
Residence		
Urban	36,543	78%
Rural	10,096	22%
Highest level of education		
Primary or lower	5,429	12%
Secondary	29,502	63%
Tertiary	11,708	25%
Househould wealth index quintiles		
Lowest	9,093	20%
Secondary	11,251	24%
Middle	9,894	21%
Fourth	8,845	19%
Highest	7,556	16%
Working		
No	31,081	67%
Yes	15,558	33%
Relationship status		
Never in union	41,205	88%
Partnered	4,191	9%
Formerly partnered	1,243	3%
Total	**46,639**	**100%**

Method

Exposure to conflict is not randomized, but socio-geographically stratified. Since Colombia is a very regionalized and diverse country, the method used must consider variation within country subdivisions, i.e., departments. In the main models, I use a multinomial logistic regression adjusted for department and year with department-clustered standard errors. The department dummy-approach adjusts for department-varying omitted factors that could co-determine women's fertility preferences and the presence of armed conflict. Since linear models risk null-results if there are opposing effects at work in the same material and theory

suggests there may be tendencies towards both wanting fewer and wanting more children, the multinomial models were identified as the best option for the topic under study. Multiple alternative analyses were explored as described in the section with the same name below.

Findings

Tables 3 and 4 present results of the multinomial logistic regressions for fertility desires. Models 1 and 2 in Table 3 examine women's desire for children, while Models 3 and 4 in Table 4 present ideals for number of children. The four models are adjusted for department and year. Models 1 and 3 control for age, the only variable that is not affected by recent conflict. Models 2 and 4 include the full set of sociodemographic controls, which could be intermediate outcomes of conflict, or so-called "bad controls" (Angrist & Pischke, 2009).

Results from Model 1 indicate that compared to wanting no more children, conflict events in the past two years are negatively associated with wanting more children after the next two years and being undecided net of controls. The statistically insignificant effect of conflict on wanting more children within the next two years pointed in a positive direction.

In Model 2, conflict related significantly and negatively to being undecided, net of controls. It seems, then, that higher exposure to conflict links to women being more decisive in terms of fertility desires in accordance with Hypothesis 3a, but there is no support for the hypotheses that conflict affects tempo or quantum preferences either positively or negatively.

Net of other sociodemographic controls and relative to ages 20–24, there were strong tendencies towards wanting more children within the next two years among ages 25–39, whereas the youngest and oldest age categories had substantially lower relative risks. Older women had, by comparison, a much lower risk of wanting children after two years and the youngest women a much higher risk. The propensity for being undecided was higher below age 35 and lower in the older age groups.

Type of place of residence only related – positively – to wanting more children within two years relative to being undecided, which could partially drive the positive fertility effect of conflict in rural areas Castro Torres and Urdinola (2018) found.

Education was positively associated to wanting more children within two years among university-educated women and later among women with higher educational levels than primary.

There was a wealth gradient in wanting more children, by which more affluent women tended to be less prone to wanting more children and vice versa.

If the respondent was employed she was, curiously, more prone to wanting children within the next two years compared to women who want no more children and the unemployed.

Not surprisingly, women who were not in union at interview were substantially lower at risk of wanting children within the next two years compared to other relationship statuses. Being formerly partnered associated to a lower risk of wanting children after two years.

There were strong positive effects of having none or one child on wanting more children and being undecided, and strong negative effects of having three or more children on all outcomes relative to wanting no more children. This gradient across parity further confirms the hegemonic status of the two-child norm in Colombia. Women with children below age 2

were mostly prone towards wanting no more children, whereas those whose youngest child was above age 6 wanted more children soon, relative to those whose youngest was aged 3–5.

Table 3. Multinomial logistic regression of women's desire for children in relation to local conflict in Colombia

	Wants within two years		Wants after two years		Undecided		Wants no more	
	RRR	t-value	RRR	t-value	RRR	t-value	RRR	t-value
Model 1								
Age (ref. 20–24)								
13–19	0.421***	(-14.27)	2.624***	(22.20)	2.676***	(9.40)	(ref.)	
25–29	1.367***	(8.80)	0.426***	(-27.80)	0.980	(-0.29)	(ref.)	
30–34	1.195***	(4.52)	0.176***	(-48.82)	0.884	(-1.79)	(ref.)	
35–39	0.868**	(-3.25)	0.053***	(-62.75)	0.531***	(-9.43)	(ref.)	
40–44	0.481***	(-14.98)	0.015***	(-58.93)	0.281***	(-13.67)	(ref.)	
45–49	0.245***	(-22.62)	0.006***	(-34.06)	0.193***	(-12.82)	(ref.)	
Conflict events in past year	1.001	(0.64)	0.998*	(-2.01)	0.996**	(-2.65)	(ref.)	
Constant	0.300***	(-18.39)	1.957***	(11.39)	0.062***	(-14.96)	(ref.)	
Model 2								
Age (ref. 20–24)								
13–19	0.208***	(-18.14)	1.166***	(4.23)	1.359***	(4.10)	(ref.)	
25–29	1.988***	(14.60)	0.689***	(-12.05)	1.330***	(3.62)	(ref.)	
30–34	2.079***	(11.39)	0.366***	(-24.13)	1.378***	(4.59)	(ref.)	
35–39	1.511***	(5.84)	0.121***	(-41.53)	0.863	(-1.90)	(ref.)	
40–44	0.761***	(-3.55)	0.034***	(-37.42)	0.447***	(-7.63)	(ref.)	
45–49	0.351***	(-12.86)	0.013***	(-27.01)	0.299***	(-7.86)		
Rural (ref. urban)	1.127**	(2.87)	1.014	(0.38)	1.100	(1.87)	(ref.)	
Education (ref. primary or less)								
Secondary	1.050	(1.33)	1.367***	(9.03)	0.915	(-1.26)	(ref.)	
Tertiary	1.193**	(2.96)	1.748***	(10.55)	1.132	(1.54)	(ref.)	
Wealth index quintiles (ref. middle)								
Lowest	1.122*	(2.18)	1.114**	(2.66)	1.062	(0.91)	(ref.)	
Second	1.034	(1.12)	1.052*	(2.05)	0.901	(-1.64)	(ref.)	
Fourth	0.917**	(-2.64)	0.938**	(-2.58)	1.026	(0.42)	(ref.)	
Highest	0.834***	(-3.67)	0.999	(-0.02)	0.939	(-0.75)	(ref.)	
Working (ref. no)								
Yes	1.181***	(5.28)	1.033	(1.71)	0.983	(-0.40)	(ref.)	
Relationship status (ref. never in union)								
Partnered	7.543***	(26.85)	1.216***	(6.15)	1.043	(0.71)	(ref.)	
Formerly partnered	2.629***	(20.15)	0.908**	(-2.66)	0.931	(-0.79)	(ref.)	
Parity (ref. 2)								
0	54.728***	(26.01)	11.087***	(30.90)	4.261***	(16.87)	(ref.)	
1	5.161***	(23.03)	3.041***	(25.68)	1.799***	(8.06)	(ref.)	
3	0.479***	(-8.63)	0.508***	(-12.26)	0.557***	(-5.85)	(ref.)	
4+	0.301***	(-11.38)	0.346***	(-9.98)	0.270***	(-7.92)	(ref.)	
Age of youngest child (ref. 3–5 years)								
0–2 years	0.276***	(-21.29)	0.820***	(-4.57)	0.710***	(-4.52)	(ref.)	
6+ years	1.600***	(9.46)	0.959	(-1.04)	1.043	(0.38)	(ref.)	
Conflict events in past year	1.002	(1.81)	0.999	(-0.50)	0.997*	(-1.99)	(ref.)	
Constant	0.011***	(-21.89)	0.358***	(-12.82)	0.035***	(-14.60)	(ref.)	

□Significant at p < 0.05; □□p < 0.01; □□□p < 0.001; RRR=relative risk ratio; ref.=reference; adjusted for department and year

Model 3 shows that compared to considering two children the ideal number, conflict events had a positive relationship to the relative risk of wanting four or more children only.

In Model 4, in comparison to two children, conflict exposure associated to a negative risk of wanting zero children, and a positive risk of wanting four or more children. This may be reflective of a pronatalist turn in response to conflict, in accordance with Hypothesis 1a. The other coefficients were not statistically significant.

Net of other controls, women aged 25 or above had substantially higher risks of wanting fewer children than two compared to those aged 20–24. The positive age gradient likely reflects the selective sample, since older childless women may have adjusted their expectations or are more likely to want fewer children. The youngest women were less likely to want one child and women aged 30–39 less likely to want three children. Childless women aged 40 or above are, curiously, substantially more prone to wanting four or more children.

Women living in rural areas had a higher preference for considering four or more children to be ideal, again a potential driver of Castro Torres and Urdinola's (2018) findings.

Women with higher levels of education than primary were at lower risk of preferring fewer than two or more than four children. University-educated women were more prone to wanting three children than two.

Women in the fourth and highest household wealth quintiles reported a higher preference for zero children. Women in the lowest quintile were more prone to prefer three or more children, and less prone to wanting one child. The richest quintile of women was also more likely to want three children, pointing towards a polarization within the group.

Employment only related, negatively, to preferring zero children.

Partnered women were more prone towards larger families than smaller. Formerly partnered were less likely to want zero children.

Table 4. Multinomial logistic regression of women's ideal number of children in relation to local conflict in Colombia

	0		1		2		3		4	
	RRR	t-value	RRR	t-value	RRR	t-value	RRR	t-value	RRR	t-value
Model 1										
Age (ref. 20–24)										
13–19	1.204*	(1.97)	0.969	(–0.63)	(ref.)		0.872***	(–3.37)	1.025	(0.31)
25–29	1.197**	(2.80)	1.319***	(6.71)	(ref.)		0.915	(–1.31)	0.842	(–1.39)
30–34	2.015***	(5.87)	1.690***	(8.90)	(ref.)		0.805*	(–2.49)	1.025	(0.13)
35–39	3.394***	(11.17)	2.123***	(11.45)	(ref.)		0.773*	(–2.44)	1.051	(0.20)
40–49	6.312***	(20.75)	2.176***	(8.04)	(ref.)		1.042	(0.34)	2.455***	(4.71)
Conflict events in past year	0.996	(–1.83)	1.001	(0.73)	(ref.)		1.001	(1.02)	1.007***	(3.32)
Constant	0.099***	(–12.90)	0.333***	(–12.75)	(ref.)		0.176***	(–23.73)	0.035***	(–23.25)
Model 2										
Age (ref. 20–24)										
13–19	0.943	(–0.68)	0.879*	(–2.22)	(ref.)		0.984	(–0.38)	0.982	(–0.23)
25–29	1.311***	(3.87)	1.344***	(6.59)	(ref.)		0.876	(–1.85)	0.805	(–1.67)
30–34	2.228***	(6.41)	1.702***	(8.95)	(ref.)		0.766**	(–2.91)	0.920	(–0.41)
35–49	4.776***	(18.61)	2.021***	(8.87)	(ref.)		0.888	(–1.20)	1.490*	(2.16)
Rural (ref. urban)	1.170	(1.94)	0.915	(–1.81)	(ref.)		0.936	(–0.87)	1.253*	(2.28)
Education (ref. primary or less)										
Secondary	0.467***	(–6.87)	0.679***	(–6.26)	(ref.)		1.028	(0.46)	0.629***	(–5.29)
Tertiary	0.420***	(–6.45)	0.589***	(–6.99)	(ref.)		1.222**	(2.69)	0.597***	(–3.81)
Wealth index quintiles (ref. middle)										
Lowest	0.875	(–1.11)	0.890*	(–2.25)	(ref.)		1.287**	(3.18)	1.388**	(2.60)
Second	0.882	(–1.45)	0.974	(–0.67)	(ref.)		1.069	(1.23)	0.936	(–0.60)
Fourth	1.165***	(3.59)	1.051	(1.57)	(ref.)		1.018	(0.37)	1.004	(0.05)
Highest	1.202***	(3.58)	1.006	(0.15)	(ref.)		1.145*	(2.11)	1.221	(1.84)
Working (ref. no)										
Yes	0.886*	(–2.21)	1.000	(0.01)	(ref.)		1.035	(0.82)	1.077	(1.10)
Relationship status (ref. never in union)										
Partnered	0.348***	(–12.26)	0.808***	(–4.63)	(ref.)		1.294***	(3.80)	1.487***	(3.45)
Formerly partnered	0.682***	(–4.64)	0.959	(–0.60)	(ref.)		1.073	(0.66)	1.082	(0.49)
Conflict events in past year	0.996*	(–2.23)	1.001	(0.88)	(ref.)		1.001	(0.79)	1.005**	(2.73)
Constant	0.213***	(–11.82)	0.512***	(–7.14)	(ref.)		0.141***	(–16.68)	0.046***	(–18.92)

*Significant at $p < 0.05$; **$p < 0.01$; ***$p < 0.001$; RRR=relative risk ratio; ref.=reference; adjusted for department and year

Predicted Probabilities

To examine the social, and not only statistical, significance of the above presented findings, marginal effects based on the full models were calculated at specified values of conflict events in the past year (the basic models span similar ranges). Those results are illustrated in Figures 2 and 3.

The graphs display a remarkable stability in women's fertility preferences across the levels of exposure to local violence. It suggests that the statistically significant coefficients reported above may be picked up primarily due to the relatively large sample size for a survey study given the pooled data, rather than a statistical effect that is large enough to have any social significance. The findings detect a slight shift toward wanting more or sooner as conflict increases. But as this shift is too small to be socially significant, it is virtually a null-relationship between conflict and fertility preferences among Colombian women observed during 2000–2016.
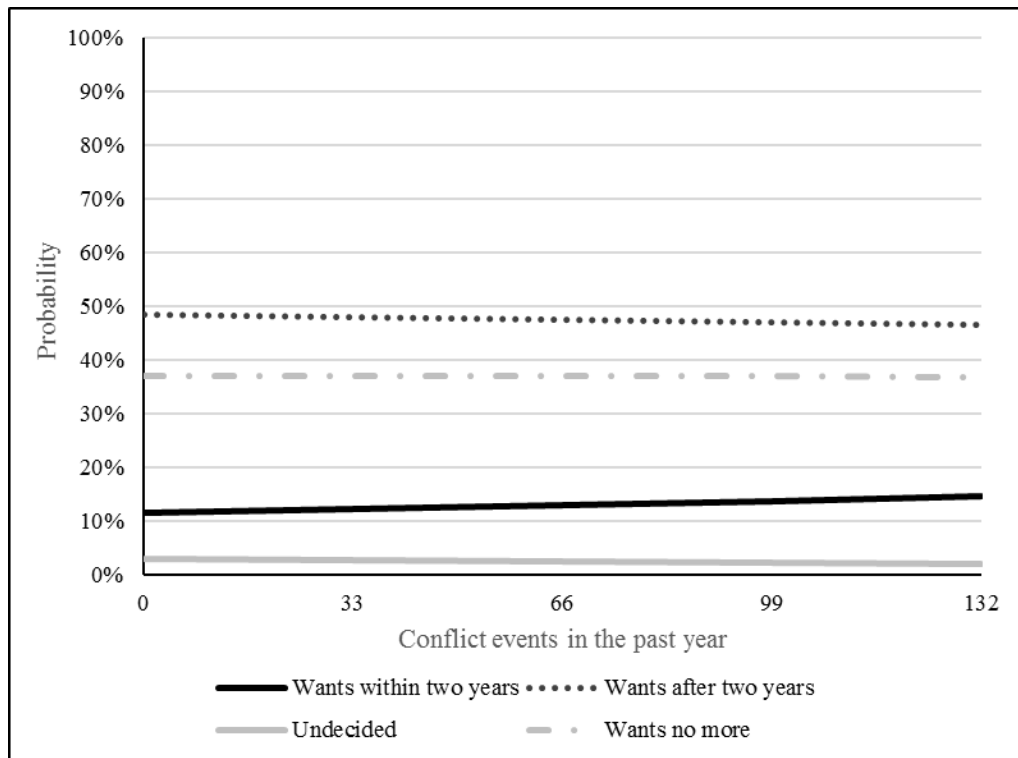
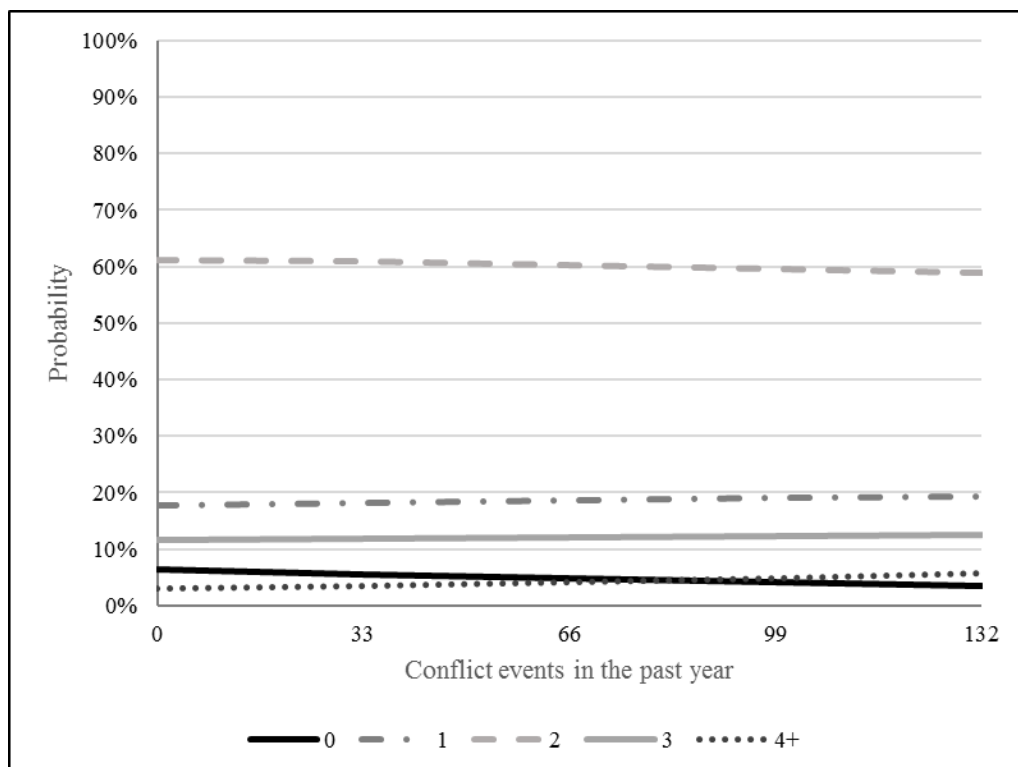Figure 2. Marginal effects of exposure to conflict in past year on desire for children

Figure 3. Marginal effects of exposure to conflict in past year on ideal number of children

Alternative Analyses

Various analyses, available upon request, were conducted to test the robustness of the above presented results.

Regardless of whether desire for children was measured with three categories (grouping wants within or after two years), using multinomial logistic regression, ordered logistic regression or fixed-effects linear regression, the null-results were robust. Ideal number of children as a continuous measure in a linear regression, an ordinal measure in an ordered logistic regression, or as a binary variable capturing whether or not women wanted two children was similarly unaffected by armed conflict[6].

The absence of social (and in many cases statistical) significance was consistent across all measurements of armed conflict, including if captured at the municipality instead of department, which is consistent with Castro Torres and Urdinola's (2018) models. Departments may be preferable over municipalities, since municipality boundaries changed over the study period and sampling on the lowest level is not representative of the population. Using the more aggregate level also compensates for within-department migration. However, women's psychological perception of conflict violence may be more salient on the municipality level.

Women who changed residence may have been misclassified in terms of conflict exposure if they moved between departments. However, the conclusions were robust to selecting on women who did not relocate during the exposure time or ever.

Since having children may result in justification mechanisms, only the ideal family size of childless women was analyzed. Including women with children while controlling for number of children and age of youngest child did not change the conclusions of the study.

Controlling for year and department could kill much of the conflict variation, but findings were robust to removing these variables, even in the models only controlling for age.

The effect of conflict could vary by groups. I added interaction terms with education, residence, wealth, age and time to Models 2 and 4 presented above. There was little or no variation across groups. It seems like fertility preferences were not a socially significant driver of the fertility increases in rural areas observed by Castro Torres and Urdinola (2018). Despite the positive coefficients of wanting more children within two years and wanting four or more children among women in rural areas, predicted probabilities displayed a fairly flat slope across the span of conflict events.

Limitations

The study suffers from limitations related to both data and modeling issues as well as survivorship and reporting bias.

One drawback to the research design is that exposure is not stable, since women may leave a department due to conflict and thus self-select assignment. Still, using department-level conflict and dummies as opposed to more disaggregated levels accounts for within-department migration.

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[6] I use fixed effects rather than random effects as the assumption in the latter model is that the unobserved variables (i.e. the individual-specific error term) are independent of all the measured variables. In the fixed effects model no such assumption is needed (Allison, 2009).

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Given that the research design is cross-sectional, it is impossible to ascertain how women's preferences have changed depending on variations in the levels of conflict violence in their vicinity over time. The study instead focused on comparing women's preferences depending on how much violence they have been exposed to. Future research would benefit from assessing this topic longitudinally, to explore changes in fertility preferences within the same individuals and approach a causal analysis of the relationship between childbearing desires and local conflict. Longitudinal data would also enable analyses of how exposure to conflict affects subsequent realizations of fertility desires.

The outcome variables used in this study may suffer from reporting bias common to attitude measures, if women are hesitant to report non-normative fertility preferences. For example, the hegemonic status of the two-child family in Colombia may incentivize women who are ambivalent or want smaller or larger families to over-report two children as their ideal (Hayford, 2009). Survey methodology may also result in women conveying more certainty around fertility preferences than they actually hold, for example if "I don't know" answers are coded as missing values or answers do not give room for ambiguity although preferences may not be well-defined or coherent according to a rational choice framework (Curtis & Arnold, 1994; Maire Ní Bhrolcháin & Beaujouan, 2019).

I only studied women's preferences because the Colombian DHS only surveyed men in the latest round. However, ideals for family size and timing of births are often interrelated within couples, due to both homogamy and convergence over time (Thomson, 1997; Yeatman & Sennott, 2014). Excluding men's childbearing desires obscures an important part of understanding how conflict relates to fertility decisions, not least in terms of women's agency.

A limitation to this study, common in studies of conflict and demography, is that the most-affected women are not represented in the data. Deceased or internationally displaced women cannot give their accounts, and internally displaced women are likely not surveyed. Even though I found no relationship between conflict and fertility preferences at the population level, it is possible that the worst-off women were also more affected in those regards.

The conflict data only includes conflict events covered by media or reports where it is certain that at least one person died, meaning that non-fatal or unreported events are not, which results in an underreporting of the real levels of violence in Colombia.

Discussion

This study explored to what extent armed conflict violence has influenced childbearing preferences among childless women in Colombia, operationalized as desire for children and ideal number of children. These matters are important because they involve women's reproductive empowerment to freely make decisions about when, whether, how often and with whom to have children. Conflict may put those rights at risk. Additionally, the findings can shed light on how preferences are linked to family planning and fertility behavior in settings of conflict. Although desires are likely not a perfect predictor of reproductive behavior in conflict-affected settings, exposure to violence contributes to our understanding of how these processes are interlinked.

The results from this study showed that higher conflict levels in the local area did not relate to variations in fertility preferences in a socially significant way, thus rejecting all proposed hypotheses. In other words, fertility preferences in terms of tempo, quantum and decisiveness

have been remarkably stable during the observed time period in relation to ongoing conflict in Colombia. The findings also confirm the entrenched two-child norm in Colombia, as more than half of women reported two children as their ideal.

Previous research exploring the changes to fertility preferences in relation to life course events – such as having a child, entering a relationship and changes in household finances – show that preferences are indeed changeable over the life course. But it also suggests that some women do not change their timing preference whatever the circumstances, even in relation to economic hardship which is one of the pathways through which we might expect preferences to shift during conflict (Ray et al., 2018; Sennott & Yeatman, 2012).

The conflict dynamics of the particular setting may lead to different responses in fertility. While, for example, the Rwandan genocide led to a shock of 800,000 deaths during just a few months in 1994 (Rutayisire et al., 2013), the protracted Colombian internal armed conflict has killed an estimated 200,000 people during the past half-century. During this time, Colombia has also transformed from a high fertility context in the 1960s to replacement levels of 2.1 children per woman on average, with a firmly established two-child norm. Therefore we should likely not observe the same kind of abrupt shock of local conflict violence on fertility preferences in Colombia as in Rwanda, which is a high-fertility context, and perhaps not the same replacement effects in the time period of interest to this article. Since the period under study is during the late stages of the armed conflict, it is possible that any substantial changes to reproductive preferences and ideals may have already taken place, for example around the time of the transition from high to low fertility (Potter et al., 1976).

Given how fertility preferences appear stable despite local violence due to armed conflict, it suggests that previous research about contraceptive choices (Svallfors, 2020; Svallfors & Billingsley, 2019) are not necessarily results of changed childbearing intentions, but rather instruments for women to realize the preferences already held. It supports the idea that access to reproductive health care goods and services including reversible short- and long-term contraception explains changes in family planning use in light of war (ibid.). The findings from this study also carry dire consequences for the interpretation of previously reported increases in fertility in response to conflict, as it is likely that those reflected unwanted births. Castro Torres and Urdinola (2018) estimated a 12 and 18 percent higher fertility rate in medium- and high rural municipalities respectively, relative to non-conflict rural areas. I found no support of an interaction effect of conflict and rurality.

More research is needed to fully comprehend how conflict shapes the proximate determinants of fertility, not least when it comes to unwanted and mistimed fertility. Regardless of what reproductive preferences women may have, the policy goal of the Colombian government as well as international development cooperation should be to assist women in realizing those desires. Such assistance entails guaranteeing access to reproductive health care goods and services as well as family-friendly policies.

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