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Mothers at peace: post-conflict fertility and United Nations peacekeeping

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Abstract: Armed conflict can shape reproductive behaviour as high child mortality and a lack of health services lead to higher fertility rates. Yet women often postpone childbearing in expectation of better times. Given the theoretical ambiguity, the extant empirical evidence is often inconclusive. As a lack of security is a key factor in shaping these decisions, we investigate whether the deployment of United Nations peacekeepers affects fertility in post-conflict settings. We study the case of Liberia from 2003 to 2019 by combining data on birth histories from three rounds of the Demographic and Health Survey with geocoded information on the distance to United Nations bases. We find that women who live in the proximity of peacekeepers have lower fertility rates in the deployment period. Furthermore, peacekeeping improves child health and fosters family planning, as parents prioritize 'quality' over 'quantity'.

Key words: fertility, conflict, UN peacekeeping

JEL classification: J13; D74; F53

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1 Introduction

War-torn nations are plagued by social insecurity, the absence of reproductive health services, and lower levels of female education. Not surprisingly, a high incidence of violent armed conflict is often associated with high fertility rates. Sub-Saharan Africa is the archetypical example. More than half of the countries in the region have experienced conflict on their territory since 1989 and at least 20 states had active armed conflicts in 2020 (SIPRI 2021). The region also has the world's highest fertility rates with women having almost five children over their reproductive lifetime, compared to a global average of 2.5 children (UN DESA 2019). In this article, we ask whether the external provision of security through United Nations (UN) peacekeeping contributes to fertility behaviour.

Fertility patterns feature prominently in the current debate about the impact of population growth on global trade and migration as media and policy makers emphasize that in the 2040s African mothers will have more than 550 million children, corresponding to about 40 per cent of all children born worldwide in that decade (Paice 2022). High fertility rates have key social implications for human development by posing health risks for children and their mothers—99 per cent of all maternal and child deaths occur in less-developed regions, with Africa being the hardest hit region (Africa Health Organisation 2019). High fertility rates also matter as they can adversely affect educational attainment and economic growth, and can exacerbate environmental threats (see, e.g., Birdsall et al. 2001; Casterline 2010).

To stabilize conflict zones and protect civilians, the UN has launched more than 70 peacekeeping missions worldwide since 1960. Today, about 70,000 multinational personnel, the so-called Blue Helmets, are deployed in 12 operations around the world, each with the mandate to keep or enforce peace. Despite a chronic lack of resources and the failure to protect civilians from atrocities in some emblematic cases, large-N studies demonstrate that peacekeeping overall reduces violence in ongoing civil wars and the probability of conflict recurrence, even when deployed in the most challenging contexts (e.g., Beardsley 2011; Bove et al. 2020; Di Salvatore and Ruggeri 2017; Hegre et al. 2019; Hultman et al. 2013; Ruggeri et al. 2017). Peacekeepers also improve households' well-being by revitalizing economic exchanges and participation in the labour market and by instilling confidence and trust (Beber et al. 2019; Bove and Elia 2018; Bove et al. 2021; Carnahan et al. 2006; Caruso et al. 2017; Nomikos 2022).[1]

Particularly relevant for this research, the local presence of UN peacekeepers can offer the security umbrella essential to *the provision of and access to* basic public services, including medical services (Blair 2019, 2021; Karim 2020). To illustrate, following an urgent request for medicines from civilians in the Kidal region of Mali in October 2015, peacekeepers that were part of the MINUSMA (United Nations Multidimensional Integrated Stabilization Mission in Mali) operation donated US$32,000 worth of supplies through a local non-governmental organization as part of a UN-branded Quick Impact Project (UN 2015).

Hence, this enhanced security that UN peacekeepers provide entails not only curbing violence but also some degree of service provision. This is qualitatively different from general post-conflict settings that exhibit peace but not necessarily service provision. Indeed, using data from Liberia,

[1] At the same time, the UN has often been roundly questioned in relation to some more-public shortcomings, with UN peacekeepers accused of sexual exploitation and misconduct (Nordås and Rustad 2013) or fathering children whose mothers are discriminated against by their communities (Lee and Bartels 2020).

Côte d'Ivoire, and the Democratic Republic of Congo, Gizelis and Cao (2021) demonstrate that the presence of peacekeepers reduces maternal mortality rates and has a positive effect on maternal health outcomes as well as on women's access to services and years of education. Yet we still know very little about whether and to what extent peacekeeping affects fertility rates in the first place.[2]

As a lack of security is a key factor in shaping fertility decisions, we explore whether the provision of a stable and secure environment through the deployment of UN peacekeepers affects fertility behaviour. Numerous studies have investigated the extent to which exposure to violence and armed conflict shapes individuals' long-term decisions including reproductive behaviour, lending support to the idea that conflict does indeed lead to higher fertility rates (see, e.g., Iqbal 2010; Islam et al. 2016; Kraehnert et al. 2019; Urdal and Che 2013). This is due to several intertwined factors, including a lack of access to contraception, low levels of education, the increased value of child labour, and a desire to replace children lost to the conflict. However, there is also empirical evidence that armed conflict can have an overall *negative, rather than positive*, impact on fertility levels, such as in Ethiopia (Lindstrom and Berhanu 1999), Angola (Agadjanian and Prata 2002), or Cambodia (De Walque 2006). Fertility rates appear to be low during the conflict but can recover once hostilities have stopped (see, e.g., Agadjanian and Prata 2002). This squares with theoretical arguments which suggest that individuals may postpone childbearing in expectation of better times or because they prioritize 'quality' over 'quantity' when raising their children (Guerra-Cujar et al. 2021; Thiede et al. 2020; Torrisi 2020).

Against this backdrop, we investigate these two countervailing dynamics by exploring the case of Liberia. This is an interesting and significant case study for several reasons. Liberia has one of the world's highest fertility rates (4 children vis-à-vis a global average of 2.5 per woman (UN DESA 2019)). At the same time, the country also hosted one of the largest and most important missions—the United Nations Mission in Liberia (UNMIL)—between 2003 and 2018. The main task of UNMIL was to support the implementation of a peace process in the immediate aftermath of the Second Liberian Civil War, whose end corresponded with the arrival of the Blue Helmets. Peace agreements and conflict termination per se do not guarantee the cessation of violence. Furthermore, even if violence subsides, its psychological impact can linger, and perceptions of insecurity may delay fertility. Focusing on the consequences of a peacekeeping operation in a post-conflict case helps us to investigate the importance of security and services provision. Furthermore, the focus on UNMIL is also motivated by the fact that other UN missions were already deployed during the conflict, hence confounding the UN's impact on fertility during the conflict and then in the peace period. These make Liberia an ideal case for studying how peace and the presence of a security provider affect fertility rates.

We combine geocoded information on the deployment of peacekeepers from the UNMIL mission with data from the Demographic and Health Surveys (DHS) conducted in Liberia in 2007, 2013, and 2019. To identify the effect of interest, we exploit plausibly exogenous variation in exposure to the local presence of peacekeepers across individuals residing in different locations within the same district. More specifically, to capture the local exposure to peacekeeping, we use the road distance of an individual's residence from the closest UN base, which allows us to measure individual exposure to peacekeeping at a very granular level.

Our analysis suggests that exposure to UN peacekeeping reduces fertility. We find that in the localities where UN troops are deployed, a woman's likelihood of having a child is reduced by

[2] Some key points distinguish our study from theirs: i) we investigate fertility rates and several related outcomes to tease out some of the mechanisms; and ii) we use a very different research design, exploiting the granularity of the data to measure exposure to peacekeeping operations (PKO) with a greater deal of precision.

5 percentage points and the total number of children per woman declines by 25 per cent. The estimated effect varies across age groups, parity level (i.e. the number of previous births), and marital status.

We find that the effect is larger for older and married women, and it increases with the number of existing children at the time of the UN deployment. To dig deeper into the relationship between peacekeeping and fertility, we explore several potential mechanisms. We find evidence that being exposed to the presence of peacekeepers is associated with an increase in contraceptive use and an increase in parental investment in children. Contraception methods, family planning, and improved children's health suggest parental investment for fewer children. As such, a *quality over quantity* dynamic may explain the declining fertility rates.

The article proceeds as follows. Section 2 provides the background material and institutional context of UNMIL and the conflict in Liberia. In that section, we present information to corroborate the relevance of the Liberia case and discuss its generalizability to cases with comparable interventions and conflict dynamics. We then move to the description of the data and the empirical strategy in Section 3, where we discuss and address concerns over endogeneity, particularly selection bias. The results are reported in Section 4, and Section 5 concludes.

2 The United Nations Mission in Liberia

In this section, we highlight some key features of both the Liberia case and the UN response to the conflict. When UN peacekeepers were first deployed to Liberia in 2003, the country had suffered two devastating civil wars between 1989 and 2003, in which, by one estimate, about 250,000 people were killed (Economist 2022). Following the resignation of President Taylor on 11 August 2003, ahead of the Accra Comprehensive Peace Agreement which formed the negotiated end to the war, the UN Security Council (UNSC) established the United Nations Mission in Liberia (UNMIL). Created as a multidimensional peacekeeping operation to monitor the August 2003 ceasefire agreement, UNSC resolution 1509 authorized the deployment of about 15,000 troops. The mission was tasked with supporting the implementation of the ceasefire agreement and the peace process, supporting humanitarian activities, and assisting in national security reforms. In 2004, the UN force consisted of a total of 14,700 personnel, with around 13,500 soldiers and 1,200 police officers and civilians. The deployment reached maximum strength in 2005 with over 16,000 personnel from more than a dozen countries. The largest concentration of Blue Helmets was stationed in the capital Monrovia. After 15 years of continuous deployment, the remaining 500 UN peacekeepers left the country in 2018. By most accounts, UNMIL was a success, leading to a landmark election that resulted in the country's first transfer of power from one elected president to another and restoring the rule of law (see e.g. Blair 2019). However, UNMIL has also been the target of justified criticism due to its lack of compliance with international norms, for example with peacekeepers engaging in transactional sex with Liberian women (Beber et al. 2017).[3]

The mandate of UNMIL evolved over time and became increasingly focused on peacebuilding tasks. Its primary aims included the protection of local populations from physical violence, supporting the Liberian government in reforming justice and security institutions, and promoting and protecting human rights activities (UN n.d.). We expect all these activities to affect fertility

[3] Indeed, Mvukiyehe and Samii (2021) find only modest effects of UNMIL on local security and socio-economic vitality.

behaviour through an improvement in the actual and perceived security environment, which in turn leads to improved *access to and the supply of* services. These services may be provided by actors that rely on the UN security umbrella, such as international agencies and non-governmental organizations. It is also possible that supporting institution-building results in a host state's improved capacity to provide services for its own citizens, although we expect humanitarian actors to play a vital role in the post-conflict setting. In this respect, as well as offering a safe environment that allows access to medical facilities, which local populations are often denied, the presence of UN peacekeepers also provides a conducive environment for the delivery of humanitarian assistance in areas where humanitarian workers are often denied access.

In addition, the UN operation can be directly involved in medical outreach initiatives. In recent years, UN peace operations have become larger, more robust, and more oriented towards the safeguard of vulnerable populations. Therefore, UN missions have witnessed a dramatic expansion in the scope of their mandate, which now often includes the support of local authorities and international and national agencies in the direct provision of public goods, including healthcare services. The UN mission in Liberia partnered with local organizations on development projects to improve the lives of the local populations. A series of 'quick impact' projects carried out across the country addressed a variety of local needs, including farming, recycling, and urban development (UN 2018). Some of these small-scale infrastructures and/or public communication projects included a health or medical component. As Davies and Rushton (2016: 424) explain in their detailed account, 'UNMIL has a long track-record of engaging in such projects in the health field, with medical outreach and related activities being undertaken by a number of different national contingents over the history of the mission'. Furthermore, UNMIL was deployed with its own medical services, providing medical services to the Blue Helmets and UN civilian staff. Yet, 'the mission's publication *UNMIL Today* frequently included reports of troops' involvement in providing medical services to civilian populations—in particular (but not only) to women and children'—whereas UN personnel also offered training to medical staff in a Liberian hospital (Davies and Rushton 2016: 426).

As the local presence of a UN peace mission results in enhanced (direct and indirect) access to medical services, we expect peacekeeping to reduce fertility. In the next section, we describe our research design, which aims to provide support to this causal proposition.

3 Data and methods

To study women's fertility, we use three rounds of the DHS conducted in Liberia in 2007, 2013, and 2019. Each round collects the dates of birth and death of all children for women of reproductive age (15–49 years). From this information, we reconstruct the full birth histories for each woman sampled. Although the first round was carried out four years after the arrival of UNMIL, this approach allows us to obtain sufficient information to study fertility from years prior to the UN deployment.

These data are combined with geocoded information on UNMIL monthly subnational deployment based on the GeoPKO dataset (Cil et al 2020). Monthly data allow us to identify the impact of the UN deployment on fertility more precisely. From the GeoPKO dataset, we calculate the road distance between a UN base and each DHS cluster and assign the treatment, i.e. exposure to peacekeeping, based on the exact date (month and year) that the deployment took place. In more detail, we use road networks to measure distance and then assign the treatment to women living within a 10km distance from the UN base. Because women's locations correspond to the centroid of the surveyed cluster, more than one woman is usually associated with these coordinates.

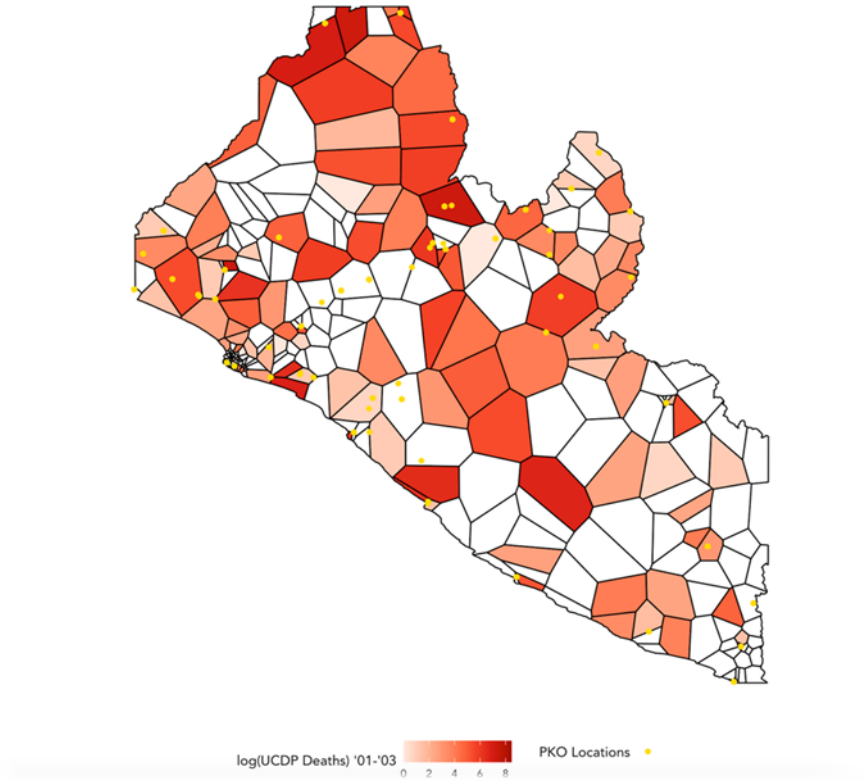
Therefore, we can track whether and when women lived in the immediate vicinity of peacekeepers, and whether and when they had children. The descriptive statistics of the main variables used in the empirical analysis are reported in Table A1 in the Appendix.

Using temporarily and spatially fine-grained identification of the treatment improves our inference on the impact of UNMIL on women's fertility. In particular, the combination of individual-level data with information on the local deployment of peacekeepers allows us to explore plausibly exogenous variation in deployment and women's intentions to have children for exposed and unexposed localities.

One possible threat to the proposed identification is posed by selection bias, i.e. the position of peacekeepers can be driven by the previous level of violence in clusters that record lower (or higher) fertility rates. We assuage this concern by visually comparing pre-deployment levels in violence, i.e. the log number of civilian deaths during the second civil conflict (2000–03) between exposed and unexposed areas.

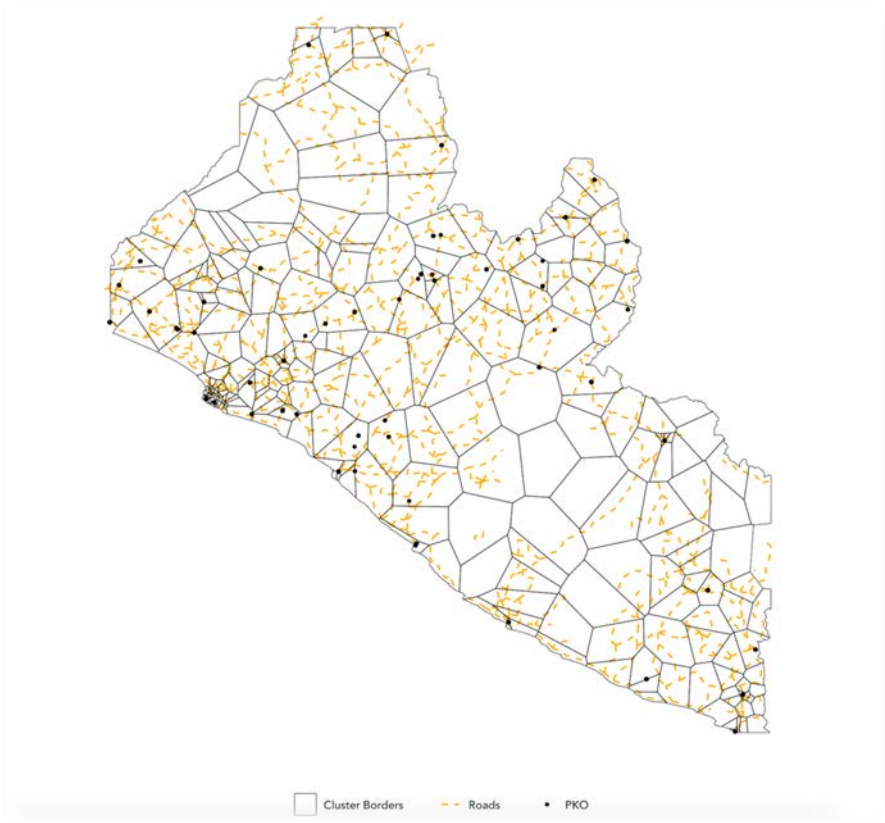
Figure 1 shows PKO locations across clusters in Liberia and the level of pre-deployment violence. There is no discernible relationship between the presence of peacekeepers and previous violence as peacekeepers are not concentrated in areas characterized by higher conflict intensity in the past. On the contrary, peacekeepers are mostly deployed along the main roads, thus presumably in more urban areas of the country (see Figure 2). We take advantage of this regularity and construct a measure of local exposure to peacekeeping in terms of the road distance between a woman's residence and the closest UN base, which allows us to capture individual exposure to peacekeeping with a fine-grained level of precision. Figure 3 provides two examples of how granular our measure is. Individuals (black asterisks) may be equally distant from peacekeepers (black circlers) according to road network (in orange), but we might erroneously fail to account for this information if only individuals living in a PKO cluster (black border) were considered as treated. In other words, respondents residing in two different clusters would be equally 'treated', given their distance from the UN base, even though peacekeeping is only present in one of the two clusters.

Figure 1: Pre-deployment violence (2000–03) and peacekeeping location



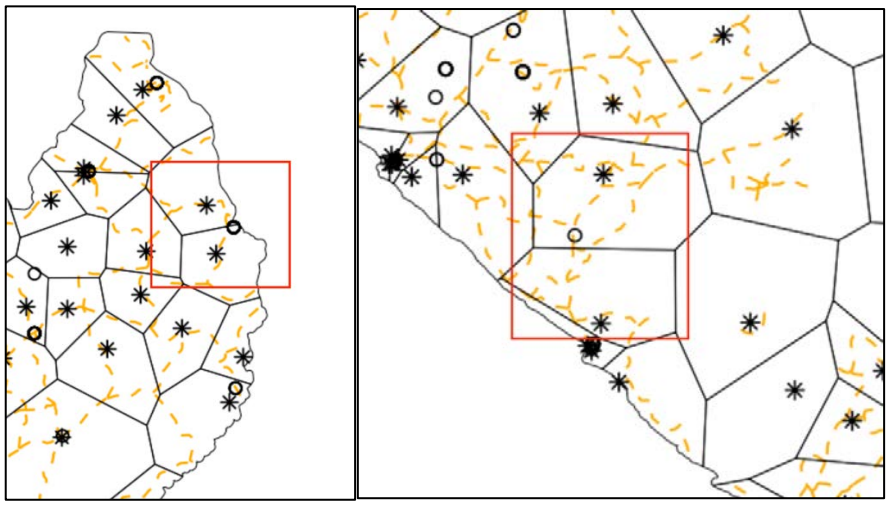
Source: authors' compilation.

Figure 2: Liberia road network (orange) and peacekeeping locations



Source: authors' compilation.

Figure 3: Respondents' location (asterisks) and distance form PKO base (circles)



Source: authors' compilation

As mentioned above, even though the DHS is not a panel survey, the birth histories can be used to track each woman's pregnancy in the period before and after the arrival of the mission. The first wave took place in 2007 when peacekeeping troops were already in the country (the mission started in 2004). Moreover, to identify before-deployment and after-deployment fertility episodes, we take advantage of the fact that peacekeepers moved across the country, leaving some areas and/or patrolling new ones.

The estimated specification takes the following form:

$$Y_{icjt} = \alpha_i + \beta PKO_c + \delta' X_{icjt} + \gamma' Z_c + \mu_j + \eta_t + \epsilon_{icjt} \quad (1)$$

The dependent variable Y_{icjt}, is a dummy which takes the value of one if a woman *i* residing in cluster *c* located in district *j* and interviewed at time *t* reports any births since the arrival of the peacekeepers, and takes zero otherwise. Births are coded as post deployment if they occurred at least nine months after a UNMIL contingent moved close to the cluster. In doing so, we do not overestimate the impact of UNMIL on fertility by including births from pregnancy that started before the actual deployment. In alternative specifications, we use the number of children born since the UN deployment. The main variable of interest is the dummy PKO_c, which captures the presence of peacekeepers within a 10km road distance from *i*'s cluster centroid. Note that the treatment dummy accounts also for the timing of deployment as it factors in the different arrival dates of peacekeepers in the cluster. We experimented with different radius lengths, from 10 to 40km, and find that the size of β decreases as we move away from the location of residence, but the only statistically significant indicator remains the one measuring presence within 10km.

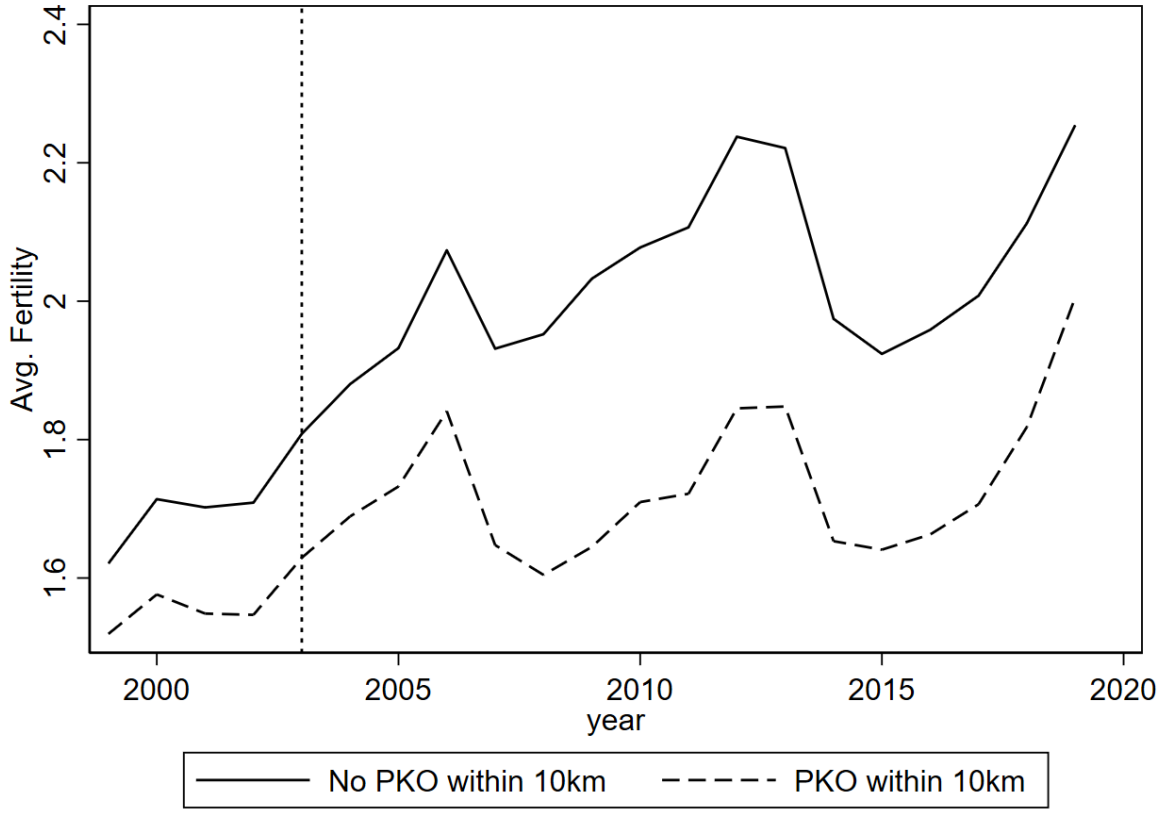
To mitigate concerns about endogeneity and to get as close as possible to an estimate of causal effect, we control for an array of women's predetermined characteristics. The vector X_{icjt} includes age, education, marital status, type of residence (urban versus rural), number of children before the UN deployment, household's wealth, and the number of dead children (in total and those under the age of five) before the arrival of the mission. We use also subnational characteristics, all available at the cluster level (indicated by vector Z_c in equation (1)), such as malaria prevalence, population size, population under five years old, rainfall, proximity to water, proximity to national borders, land aridity, drought episodes, economic activity, irrigation, livestock, and the average

time to reach a major settlement. The inclusion of cluster-level variables allows us to compare women who share similar social, economic, demographical, and environmental conditions.

Furthermore, we include both district (second-order administrative units in Liberia) and wave fixed effects, denoted by μ_j and η_t, respectively. These strategies guard against spurious correlation and ensure identification of peacekeeping impact. In the robustness analysis, we also include the interactions between districts and wave dummies. Finally, we report standard errors clustered at the primary sample unit (PSU) level to account for potential serial and within-PSU correlation in the data.

To check that our results do not depend on pre-deployment trends in fertility, we provide a graphical test in Figure 4. We report fertility trends between exposed and unexposed areas before and after the UN intervention. We do not find evidence of pre-trends in fertility rates before the mission, but we do detect a salient divergence between the two groups in the years during deployment, notably after 2007. This further strengthens confidence in our identification strategy.

Figure 4: Fertility trends before and after UN intervention



Source: authors' compilation.

4 Results

The first round of results is presented in Table 1. All specifications in Table 1 show a negative and statistically significant impact of peacekeeping on fertility. The baseline specification, which includes only our main variable of interest—PKO 10km—is shown in column 1. The estimated coefficient is negative and significant at the 1 per cent level, suggesting that PKO exposure within a 10km radius from the cluster's centroid is associated with a 10 percentage point lower chance of having a child. This point estimate remains not only strongly significant but also sufficiently stable in magnitude when we control for the full set of individual-level characteristics in column 2, while it decreases to 8 percentage points when cluster-level factors are accounted for in column 3. The effect is robust to including district fixed effects (column 4) and both district and wave fixed effects (column 5). In particular, the results in column 5—our more conservative specification—show that women living in areas (radius of 10km) where peacekeepers are deployed have a 5 percentage point lower chance of giving birth compared to women living in localities without peacekeepers. As well as being statistically significant, the size of the coefficient is economically meaningful as the average probability of having a child is 82 per cent. As such, the substantive effect corresponds to a roughly 6 per cent decrease in the average fertility rate.

In Table A2 in the Appendix, we estimate equation (1) using a dummy for the presence of PKO in the respondents' area (column 1) and including the entire set of dummies for the presence of PKO at various distances (column 2). Taken together, the results in Table A2 indicate that the effect of exposure to treatment is salient when the distance from peacekeepers is within 10km of the respondents' location and that estimating the exposure to PKO through their presence/absence in the cluster inflates the very effect of the treatment. This is reassuring for the identification of our treatment effect.

Table 1: Main results. Dependent variable: any children post PKO

	(1)	(2)	(3)	(4)	(5)
PKO 10km	-0.100***	-0.081***	-0.076***	-0.079***	-0.048***
	(0.013)	(0.016)	(0.016)	(0.018)	(0.016)
Age		0.021***	0.020***	0.020***	0.001
		(0.003)	(0.003)	(0.003)	(0.003)
Age (sq)		-0.000***	-0.000***	-0.000***	-0.000***
		(0.000)	(0.000)	(0.000)	(0.000)
Married pre PKO		-0.037***	-0.033***	-0.029***	0.071***
		(0.008)	(0.007)	(0.007)	(0.007)
Primary education		0.023***	0.019**	0.019***	0.020***
		(0.008)	(0.008)	(0.007)	(0.007)
Secondary education		-0.048***	-0.040***	-0.039***	-0.045***
		(0.011)	(0.010)	(0.010)	(0.009)
Children pre PKO		-0.044***	-0.044***	-0.043***	-0.006*
		(0.003)	(0.003)	(0.003)	(0.003)
Children dead pre PKO		0.004	0.007	0.008	-0.006
		(0.006)	(0.006)	(0.006)	(0.005)
Wealth index		-0.002	-0.000	0.000	-0.001
		(0.002)	(0.003)	(0.002)	(0.002)
Urban		-0.024	0.017	0.020	-0.023
		(0.015)	(0.016)	(0.016)	(0.015)
U-5 mortality pre PKO		0.074***	0.072***	0.070***	0.050***
		(0.009)	(0.009)	(0.008)	(0.008)
Observations	17,226	17,226	17,226	17,226	17,226

Cluster-level controls	NO	NO	YES	YES	YES
District fixed effects	NO	NO	NO	YES	YES
Wave fixed effects	NO	NO	NO	NO	YES

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU.

Source: authors' calculations.

We probe the robustness of our results through a round of robustness checks, reported in Table 2. First, in column 1 we show that our main finding holds with the inclusion of district-by-wave fixed effects, that is, when we consider the effect of district time-varying factors that might be correlated with fertility decisions. Second, in column 2, we show that the effect is not driven by specific clusters with very high concentration of peacekeepers; our main result holds when we exclude areas with top 5 per cent troops deployed. Third, as one possible threat to our identification strategy is that individuals might endogenously decide to move across clusters that are differently exposed to peacekeeping, we estimate our main specification by excluding women who migrated since the arrival of the peacekeepers (corresponding to 13 per cent of the sample). Reassuringly, the point estimate in column 3 is remarkably similar to the baseline. Fourth, given the high prevalence of UN bases in urban areas, our main coefficient of interest could be contaminated by endogeneity from uncontrolled confounding variables if, for example, women with a lower propensity to have a child live predominantly in urban areas. We thus consider respondents in urban clusters only, leveraging variation in the local exposure to PKO among individuals who are more likely to be treated given their proximity to main roads. The results in column 4 are quantitatively similar to those in our baseline specification.

Finally, we check whether the estimated effect of peacekeeping is contaminated by previous levels of violence. If peacekeepers were deployed in areas which experienced higher levels of conflict during the Second Liberian Civil War in 1999–2003, the impact of peacekeeping on fertility would blend with the effect of conflict. Recall that Figure 3 suggests no obvious relationships between the deployment of peacekeepers and previous levels of violence. In columns 5 and 6 of Table 2, we further probe this by including two alternative measures of conflict in our specification: i) an objective indicator which is the cumulated conflict deaths taken from the Uppsala Conflict Data Program (UCDP) data; and ii) a subjective measure obtained from the DHS which gauges whether the respondent had to relocate to a camp or to leave their home because of conflict. Reassuringly, the estimates in both columns 5 and 6 are very similar to our main estimates.

Table 2: Robustness checks. Dependent variable: any children post PKO

	(1)	(2)	(3)	(4)	(5)	(6)
	District-wave FE	Trimming top 5% troops	Excluding migrants	Urban clusters only	Conflict (#deaths UCDP)	Conflict (DHS)
PKO 10km	-0.043***	-0.045***	-0.052***	-0.049**	-0.049***	-0.043*
	(0.014)	(0.016)	(0.017)	(0.025)	(0.016)	(0.022)
Observations	17,226	16,308	14,959	6,566	17,226	5,245

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.

Having explored the impact of peacekeeping on the odds of having a child (the extensive margin), we investigate how exposure to peacekeepers shapes the number of post-deployment births (the intensive margin). The results are reported in Table 3 and show a significant and negative effect of exposure to PKO on the total number of children born after the deployment of peacekeepers. This result is robust to the gradual inclusion of the full set of control variables. With respect to the

magnitude of the estimated coefficient, the results from our preferred specification in column 5 show that being exposed to PKO seems to reduce the number of children born in the post-deployment period by 25 per cent. This effect corresponds to about a 13 per cent decrease in the average number of children.

Table 3: Intensive margin. Dependent variable: number of children post PKO

	(1)	(2)	(3)	(4)	(5)
PKO 10km	-0.725***	-0.396***	-0.378***	-0.390***	-0.247***
	(0.061)	(0.057)	(0.059)	(0.071)	(0.050)
Observations	17,226	17,226	17,226	17,226	17,226
Cluster-level controls	NO	NO	YES	YES	YES
District FE	NO	NO	NO	YES	YES
Wave FE	NO	NO	NO	NO	YES

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU.

Source: authors' calculations.

4.1 Heterogeneity

In this section, we investigate whether the PKO impact on fertility may vary according to the following four individual-level characteristics: women's age, parity (i.e. the number of pre-existing children), education, and place of residence (rural versus urban). These results are reported in Table 4.[4] We find that the impact of peacekeeping on fertility is negative for all age groups, and the effect is larger for older women, especially for those aged 30–45 at the time of the deployment (column 1). We detect a negative effect for all parity levels, which gradually increases with the number of existing children at the time of PKO deployment (column 2). We uncover larger effects for women who were married at the time of the deployment compared to unmarried ones (column 3). Finally, we do not find statistically significant differences across women with different levels of education (column 4) or living in different areas (column 5).

Table 4: Heterogeneity. Dependent variable: any children post PKO

	(1) Age	(2) Parity	(3) Marital status	(4) Second. edu.	(5) Urban resid.
PKO 10km	-0.028	-0.001	-0.025	-0.043**	-0.053**
	(0.018)	(0.017)	(0.018)	(0.017)	(0.021)
PKO 10km * Aged 20–29	-0.022*				
	(0.013)				
PKO 10km * Aged 30–45	-0.067***				
	(0.018)				
PKO 10km * Parity 1		-0.074***			
		(0.020)			
PKO 10km * Parity 2+		-0.082***			
		(0.015)			
PKO 10km * Married pre PKO			-0.037***		
			(0.012)		
PKO 10km * Secondary Education				-0.022	
				(0.015)	

[4] Table A3 in the Appendix reports heterogeneity analyses obtained using the number of children post PKO (the intensive margin) as the dependent variable.

PKO 10km * Urban					0.011
					(0.023)
Observations	17,226	17,226	17,226	17,226	17,226

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.

4.2 Mechanisms

To shed light on the mechanisms underlying the strong negative association between peacekeeping and fertility choices, we assess the effect of peacekeeping on the following two channels. The first one relates to the increased access to health services, which should influence maternal and child health. In particular, we focus on the number of antenatal visits, women's iron intake, child's birthweight, the number of postnatal visits, the number of dead children under the age of five, and women's use of contraceptives. The second mechanism relates to the opportunity cost of childbearing and includes women's employment status, their control over earnings, and their role in large family purchases.

The results for the first mechanism are presented in Table 5. They show that exposure to PKO is associated with an increase in both maternal and child health, as evidenced by an improvement in all health indicators, as well as by an increase in contraception use. This suggests that the impact of peacekeeping on fertility may operate mainly through an increase in parental investment, pointing to a substitution between the quantity and quality of children. To put it differently, women exposed to the local presence of peacekeepers tend to reduce the number of children and invest more in the quality of their children.

Table 5: Effects of PKO on increased access to maternal health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	No. antenatal visits	Deliver at home	Iron intake	Birth weight	Postnatal visits	Under-5 mortality	Contraception use
PKO 10km	0.353**	-0.041*	0.024**	0.217***	0.059**	-0.028**	0.036***
	(0.154)	(0.023)	(0.012)	(0.077)	(0.024)	(0.011)	(0.012)
Observations	10,501	11,419	11,128	2,752	9,538	17,226	14,225

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.

Finally, in Table 6 we report the estimates of the effect of exposure to peacekeeping on variables associated with the opportunity cost of raising children. The results in Table 6 show that being exposed to the local presence of peacekeepers does not affect women's employment status or their role in family budgeting, indicating that the opportunity cost is a less salient factor in explaining the decrease in fertility associated with peacekeeping.

Table 6: Effects of PKO on opportunity cost of raising children

	(2) Currently employed	(3) Decision on earnings	(4) Decision on large purchases
PKO 10km	-0.029	0.010	-0.009
	(0.020)	(0.009)	(0.015)
Observations	17,150	17,168	17,189

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.

5 Final remarks

Civil wars have a detrimental effect on countries' economic prospects and crucially shape individuals' long-term decisions, some of which linger in the post-conflict phase. Extant research has focused on behavioural changes in the public sphere (e.g. community participation) and on the psychological sphere of conflict legacies (e.g. trauma). In between these two areas, the legacy effect of conflict on reproductive behaviour belongs to the personal sphere but at the same time has significant long-term implications for development in post-conflict settings.

Previous studies have shown that UN peacekeeping is effective in reducing the level of violence in ongoing conflict and the probability of conflict relapse. However, we know relatively little about whether and to what extent these security-enhancing interventions can shape the socio-economic conditions of local communities. The present paper aims to fill this gap. We studied the case of Liberia, which hosted one of the largest UN peace operations, deployed between 2003 and 2018, to support the implementation of a peace process in the immediate aftermath of the Second Liberian Civil War.

We leveraged geocoded information on the subnational deployment of peacekeepers and data on maternal and child health and on fertility using the childbirth histories of women from three rounds of the DHS. The granularity of the data—particularly the distance between the presence of peacekeepers and the location of respondents—allowed us to probe whether this link was causal and which mechanisms were likely at play.

We found that the UN has a significant and socially meaningful impact on the likelihood of having a child. Women exposed to the local presence of peacekeepers experience a lower likelihood of having a child and a reduction in the number of children they have in the post-deployment period. Moreover, the effect is heterogeneous by age, marital status, and parity, while it does not vary by education level and type of location (rural vs urban). In particular, the estimated effect is larger for older and married women, and it increases with the number of existing children at the time of the deployment. We also provide evidence that the estimated negative effect of peacekeeping on fertility is explained by improved maternal health and childbirth outcomes as well as a greater probability of contraceptive use. This suggests that the presence of peacekeepers, in addition to improving local security, can support better and more-informed family planning.

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Appendix

Table A1: Summary statistics

	(1)	(2)	(3)	(4)	(5)
	Count	Mean	SD	Min	Max
Any children since PKO	17,226	0.816	0.387	0	1
No. children since PKO	17,226	1.875	1.529	0	11
PKO 10km	17,226	0.389	0.488	0	1
Age	17,226	32.728	8.303	15	49
Married pre PKO	17,226	0.629	0.483	0	1
Primary education	17,226	0.282	0.450	0	1
Secondary education	17,226	0.228	0.420	0	1
No. children pre PKO	17,226	2.141	2.452	0	15
No. children dead pre PKO	17,226	0.453	1.002	0	10
Wealth	17,226	0.001	1.582	-1.258462	57.30864
Urban	17,226	0.381	0.486	0	1
Under-5 mortality pre PKO	17,226	0.142	0.439	0	5

Source: authors' calculations.

Table A2: Robustness checks on treatment variable. Dependent variable: any children post PKO

	(1)	(2)
PKO 0/1	-0.165***	
	(0.017)	
PKO 10km		-0.064***
		(0.020)
PKO 10–20km		-0.017
		(0.016)
PKO 20–30km		-0.017
		(0.014)
PKO 30–40km		-0.010
		(0.015)
Observations	17,226	17,226

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.

Table A3: Heterogeneity. Dependent variable: no. of children post PKO.

	(1) Age	(2) Parity	(3) Marital status	(4) Education	(5) Residence
PKO 10km	-0.166***	-0.088***	-0.121***	-0.147***	-0.138***
	(0.034)	(0.033)	(0.033)	(0.033)	(0.040)
PKO 10km * Aged 20–29	-0.016				
	(0.022)				
PKO 10km * Aged 30–45	-0.090***				
	(0.035)				
PKO 10km * Parity 1		-0.081**			
		(0.032)			
PKO 10km * Parity 2+		-0.132***			
		(0.030)			
PKO 10km * Married pre PKO			-0.056**		
			(0.022)		
PKO 10km * Secondary Education				-0.037	
				(0.029)	
PKO 10km * Urban					-0.041
					(0.048)
Observations	17,226	17,226	17,226	17,226	17,226

Note: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors clustered by PSU. Cluster-level controls plus district and wave fixed effects are included in all specifications.

Source: authors' calculations.