Food and Agriculture Organization of the United Nations

Armed conflict and gendered participation in agrifood systems: Survey evidence from 29 African countries

Background paper for
The status of women in agrifood systems

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Abstract

This paper provides empirical microlevel evidence on the gendered impacts of armed conflict on economic activity in agriculture and other sectors, combining large-N sex-disaggregated survey data with temporally and spatially disaggregated conflict event data from 29 African countries. We find that local conflict exposure is only weakly related to labour-force participation, but strongly reduces the total number of hours worked and increases engagement in the agriculture sector. These net impacts exist for both men and women. However, the reduction in hours worked is significantly greater among men, while the increase in agricultural activity is significantly greater among women. In the longer term, impacts of conflict on employment two years later are stronger when no more conflict ensues than if further conflict occurs, challenging the widespread idea of one-off conflict shocks fading away over time and suggesting that labour markets adapt to and absorb lasting conflict situations. Different types of conflict event have qualitatively similar impacts, which are strongest for explosions, such as from air strikes or landmines. Overall, our findings underline that armed conflict entails structural economic, social and institutional change, which creates complex, gendered impacts on economic activity.

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1 Introduction

It is well known that armed conflicts can have strong economic impacts and that these typically vary along gender lines (Verwimp, Justino and Brück, 2019). Gendered economic impacts may, for example, arise due to transformations in the demographic structure of affected populations, changes in gender norms and differential responses to conflict and trauma exposure between men and women (Goldstein, 2001; Buvinic *et al*., 2013; Strachan and Haider, 2015; Justino, 2018; Kraehnert *et al*., 2019). Yet, the resulting impacts on economic activity are far from uniform, especially for women (Acemoglu, Autor and Lyle, 2002; Bozzoli, Brück and Wald, 2013; Fernández, Ibáñez and Peña, 2014; Menon and van der Meulen Rodgers, 2015; Shemyakina, 2015; Robertson, Lopez-Acevedo and Morales, 2020; Greiner, 2022).

Women's economic activity can rise during and after conflicts because of changes in household composition and the requirement for women to take on new roles (Kool, 2015; Justino, 2018). A key underlying driver of this effect is that men typically make up most fighters in armed conflict, they are disproportionately more likely to be victims of military operations and their recruitment, disability, capture and deaths are the primary cause of reductions in civilian labour supply in general (de Jonge Oudraat, 2011). Fertility and marriage behaviours may also change because of shortages of males (Calderón, Gafaro and Ibáñez, 2011). In terms of male deaths, Justino *et al.* (2012), for example, show that after war, widows accounted for more than half of all adult women in Angola, Bosnia and Herzegovina, Kosovo, Mozambique and Somalia, and the share of female-headed households increased by as much as 30 percent in postconflict Colombia and the Sudan. As a result, the time women spend on productive tasks and their participation in the labour market can increase in conflict-affected settings (e.g. Calderón, Gafaro and Ibáñez, 2011). An important caveat identified by the literature is that some of the increases might be short-lived and fade away over time, for example due to men returning home, postconflict policies and sticky gender roles hindering permanent change (Justino *et al.* 2012; Akbulut-Yuksel, Khamis and Yuksel, 2016). This insight emphasizes the importance of considering different time horizons when studying the linkages between conflict and women's economic activity.

Conversely, armed conflict might reduce women's participation in economic activities. As noted above, women's economic activity may replace men's economic activity in conflict settings, at least temporarily. However, gender-based norms and restrictions may prevent labour reallocation from occurring in the first place; they may also reduce women's economic activity, for example when the norms and restrictions become more salient or stronger during a conflict (Greiner, 2022). Examples of adverse norms and constraints are related to access to information and networks (Ormhaug, Meier and Hernes, 2009; Quisumbing, Meinzen-Dick and Njuki, 2019), economic resources and opportunities such as land, education, credit and formal employment (Brück and Vothknecht, 2011). Female-headed households, in particular, face numerous social and economic constraints following conflict, including a lack of property rights over the land of parents or deceased husbands, land scarcity, pressures from refugee return and inadequate legal protection (Brück and Schindler, 2009; Greenberg and Zuckerman, 2009). Moreover, economic opportunities in general can become scarcer as a result of conflict and fertility might go up or down for this or other reasons (Justino, Leone and Salardi, 2015). Fertility rates across countries have generally fallen by up to one-third during civil conflict over the last 40 years and have rebounded quickly after conflict ends (Madsen and Finlay, 2019). Relatedly, women may face increasing time constraints when the number

of roles and tasks they have increase during conflict, such as when young male household members who might otherwise provide care for younger siblings and older family members are recruited. In addition, women's movement can be severely restricted in some circumstances due to security concerns, preventing them from participating more actively in social, economic and political activities outside their homes (Pratt and Werchick, 2004; Kalungu-Banda, 2004). Violent conflicts can also put women and girls' health and safety at great risk (Østby, 2016; Ekhator-Mobayode *et al*. 2022; Stojetz and Brück, 2023), and this may severely limit their ability and willingness to engage in certain economic activities. Taken together, cultural, economic, physical and time constraints may also create negative or null net impacts on women's economic activities during and after conflicts. Which conflict effects on economic activity dominate, under which conditions and over which time horizons remains poorly understood. Empirical evidence is scarce and scattered, which is at least partly due to data constraints.

We contribute to filling this knowledge gap by providing microlevel estimates of the impacts of armed conflict on men's and women's economic activities in agriculture and other sectors based on quantitative data from 29 African countries. Specifically, we analyse participation in agrifood systems. Agrifood systems encompass the entire range of value-adding activities in the primary production of food and non-food agricultural products, and in food storage, aggregation, post-harvest handling, transportation, processing, distribution, marketing, disposal and consumption (Thompson *et al.*, 2007; Tendall *et al*., 2015). The adequate functioning of agrifood systems is key to economic growth, livelihoods, food security and nutrition outcomes, as it constitutes a fundamental part of any developing country's economy (Gillespie, van den Bold and Hodge, 2019). Yet, agrifood systems and rural populations around the world are exposed to an increasing number of stresses and are highly vulnerable to shocks, and armed conflict is a highly prevalent source of stressors and shocks (FAO, 2011; FAO, 2017; Brück and d'Errico, 2019; FAO *et al*., 2023).

We spatiotemporally match sex-disaggregated employment survey data from 1.8 million individuals in 29 countries (Nico and Azzarri, 2022) with spatiotemporally disaggregated conflict event data from multiple years. We draw on standardized labour-force survey data from household income and expenditure surveys (HIES), labour-force surveys (LFS) and living standards measurement study (LSMS) surveys. We match the survey data with conflict event data from the Armed Conflict Location & Event Data Project (ACLED) (ACLED, 2023), which provides geo-coded and time-stamped event data and covers the whole world (though this study uses data from only Africa). We study a range of employment indicators, including measures of employment status, sector of activity, intensity and income.

1.1 Key findings

We find that local conflict exposure has little influence on the likelihood of being in the labour force, but it significantly reduces the number of hours worked, with the reduction being greater for men than for women. This result is in line with the notion that armed conflicts can have highly detrimental effects on labour markets and economic opportunities. These might be more pronounced for men, in absolute terms, as men are more likely to be engaged in formal economic activities than women and typically are also more involved in conflict activity. Our results also suggest that the kind of reaction of labour markets to conflict is not so much in the absolute withdrawal

from work activities but more about changes in opportunity and an internal restructuring of time allocated to work activities, with violent conflict as a strong driver of such economic structural change (de Groot *et al.*, 2022).

Looking at different sectors, we find that conflict exposure increases the likelihood of working in agriculture, with the increase being significantly greater for women than for men. A potential explanation for this is that the increase in the number of people employed in agriculture stems from a reduced demand for labour in other sectors, combined with the relative rigidity in the demand for agrifood products and services. That is, food production may be less elastic to external shocks than other sectors. Another driving mechanism might be that rural poor women in low-income countries may have to maintain agricultural production when husbands and other male household members participate in the conflict and agriculture may also be a readily available coping strategy.

Different types of conflict event have qualitatively similar gendered impacts. The differences between event types vary substantially in terms of magnitude, but impacts are not strictly greater for events with relatively intense violence such as explosions, battles and attacks against civilians. Other conflict events, such as protests, riots and – to some degree – strategic developments also have significant impacts. In terms of magnitude, explosions have the greatest impacts of all conflict event types for several indicators.

In terms of persistence, we document that conflict shocks have particularly strong impacts on employment two years later if there is no further conflict in the period in between. When more conflict ensues during that period, impacts two years later are significantly weaker. This result challenges previous research suggesting that the capacity of labour markets to absorb and adapt to conflict situations is quite limited (Fernández, Ibáñez and Peña, 2014) and that conflict shocks have strong immediate impacts that then fade away over time (Justino *et al.*, 2012; Strachan and Haider, 2015).

The rest of the paper is organized as follows. Section 2 introduces the survey and conflict data. Section 3 outlines the empirical methodology. Section 4 presents and discusses the main results. Section 5 provides heterogeneity results and section 6 offers concluding remarks.

2 Data

For the empirical analysis, we spatiotemporally match sex-disaggregated employment survey data from 1.8 million individuals in 29 African countries with conflict event data from multiple years.

2.1 Employment survey data

We analyse a standardized labour-force survey dataset, which harmonizes HIES, LFS, and LSMS data from 29 African countries (Nico and Azzarri, 2022).

We study four main outcomes:

1. Employment status: a dichotomous variable indicating whether an individual is in the labour force
2. Intensity of employment: the total number of hours worked by an individual per week
3. Sector of activity: the number of hours worked in agriculture, industry and services
4. Income: earned income at purchasing power parity.

In addition, we use additional socioeconomic variables available from the survey data, such as gender, age, education and household size.

2.2 Conflict event data

Conflict is defined here as a spectrum of conditions of insecurity, fragility and violence. Our study gathers and analyses external data from ACLED (2023) on the types of armed conflict, their actors and when and where they occur. ACLED uses a global methodology to track a range of violent and non-violent actions by political agents, including governments, rebels, militias, identity groups, political parties, external actors, rioters, protesters and civilians (Raleigh *et al.*, 2010).

We match the ACLED data using the date and most precise location level (administrative unit) available for each survey. We draw on the number of events that occurred in each location and create dichotomous variables that indicate the presence or absence of conflict in the location for various time periods up to three years before a survey took place. We examine three different time intervals: 12 months binary indicator of conflict for the main analyses and 12–24-month and 24–36-month periods before the survey to study whether the effects of conflict fade over time. In addition, to study the heterogeneity that different types of event may have on the outcomes examined, we considered individually each of the categories defined by the ACLED taxonomy: battles, explosions and remote violence, violence against civilians, protests, riots, and strategic developments (which groups non-violent events).

3 Methodology

We estimate linear fixed-effects models to assess the effect of local conflict exposure on employment outcomes at the individual level:

$$Y_{ict} = Conflict_{ct}\,\beta_1 + Female_i\,\beta_2 + Conflict_{ct} \times Female_i\,\beta_3 + X_{ict}\,\beta_4' + n_c + d_t + \varepsilon_{ict}$$

Here, Y_{ict} is a labour-market outcome of individual i in location c at time t. $Conflict_{ct}$ is a dichotomous variable that equals one if there has been conflict in location c in a specified period of time before t (12 months in our main specification). $Female_i$ is a dichotomous variable that equals one if the individual is female and zero if the individual is male. $Conflict_{ct} \times Female_i$ is the interaction term. X_{ict} is a vector of individual- and household-level characteristics such as age, education and household size. n_c and d_t are location and year fixed effects. ε_{ict} is the error term.

The identifying assumption for estimating conflict impacts is that the presence of conflict is exogenous to individual-level choices regarding labour-market participation, the decision about what kind of activity to take part in and the decision about how many hours to work. Conflicts are first and foremost aggregate phenomena beyond the decisions of individuals in the labour market. Moreover, the fact that we measure conflicts in the periods prior to answering the survey further mitigates concerns of reverse causality in the direction of employment to conflict. By introducing time and location fixed effects we control for particular temporal and geographic trends such as differences in institutions, rule of law and idiosyncratic shocks that may have occurred in specific areas. The combined model removes potential bias both from unobservables that change over time but remain constant across locations and from factors that differ across locations but remain constant over time. By carefully controlling for individual characteristics such as educational attainment and age, we aim to mitigate concerns that individual traits may confound our main estimates.

4 Main results

4.1 Descriptive statistics

Table 1 provides summary statistics of key outcome variables and demographic characteristics, based on the total survey dataset of 1 847 531 observations from 29 countries. The average household had seven members. Fifty-one percent of all individuals were females, and their average age was 24 years. Seventy-three percent had no secondary or higher education, and for every individual aged 14 years or above there were 1.05 individuals younger than 14 years. In the 12 months prior to survey completion, the average individual was exposed to 77 conflict events, and 84 percent of individuals were exposed to at least one conflict event in the previous 12 months. Thirty-four percent of all individuals were in the labour force, out of whom 45 percent were employed in the agriculture sector. Among workers, the average number of total hours worked in the main employment was 40 hours/week, which rises 42 hours/week when secondary employment was also considered. In the agriculture sector, workers worked 37 hours/week, compared with 45 hours/week in the industrial sector and 46 hours/week in the service sector. The average monthly wage expressed in purchasing power parity in United States dollars was USD 104.

Table 1. Summary statistics at the individual level

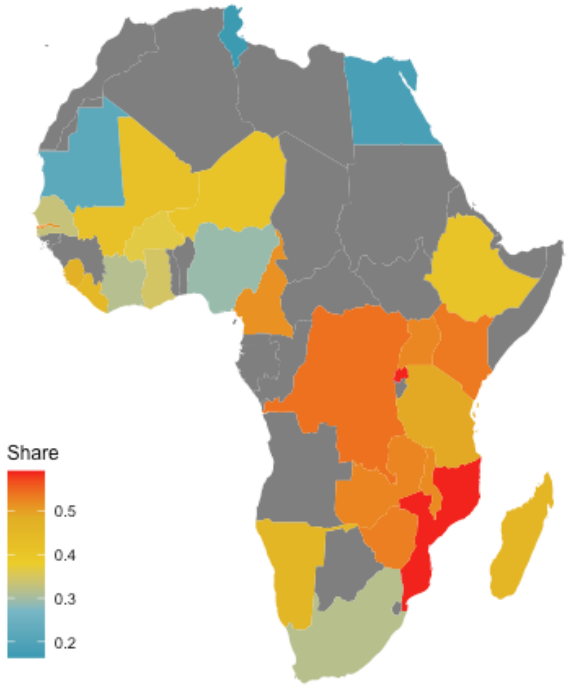
Variable	Mean (std dev)	Min	Max	N
Female	0.513 (0.500)	0	1	1 847 531
Age	24.653 (19.563)	0	120	1 847 531
No secondary education	0.728 (0.445)	0	1	1 847 531
Household (hh) size	7.017 (4.898)	1	82	1 847 531
Youth (<14)/adult ratio hh	1.047 (0.928)	0	15	1 847 531
Conflict events last 12 months	77.124 (170.237)	0	1 273	1 847 531
Any conflict last 12 months	0.836 (0.371)	0	1	1 847 531
In labour force	0.343 (0.475)	0	1	1 847 531
Not employed	0.655 (0.475)	0	1	1 847 531
Not employed/employed ratio hh	2.652 (2.615)	0	81	1 828 249
In agriculture	0.449 (0.497)	0	1	726 925
Other sectors	0.551 (0.497)	0	1	726 925
Hours worked (main)	40.617 (19.354)	0.5	168	676 832
Hours worked (total)	42.554 (17.974)	1	168	497 008

Variable	Mean (std dev)	Min	Max	N
Hours worked (agriculture)	37.224 (17.199)	1	168	197 793
Hours worked (industry)	45.197 (15.606)	1	168	79 488
Hours worked (services)	46.373 (18.192)	1	168	207 816
Hours worked (not stated)	46.806 (19.457)	1	112	11 911
Wage in USD PPP	103.757 (1 490.81)	0	354 188	356 637

Source: Authors' own calculations. (*Note*: PPP – purchasing power parity.)

Figure 1 depicts a country-level overview of female participation in agriculture, calculated as the share of women in the labour market who work in agriculture. As can be seen, there is substantial heterogeneity among the countries included in the sample, ranging from some 60 percent of economically active women being employed in agriculture in Mozambique and Rwanda to less than 20 percent in Egypt and Tunisia.

Figure 1. Share of economically active women engaged in agriculture

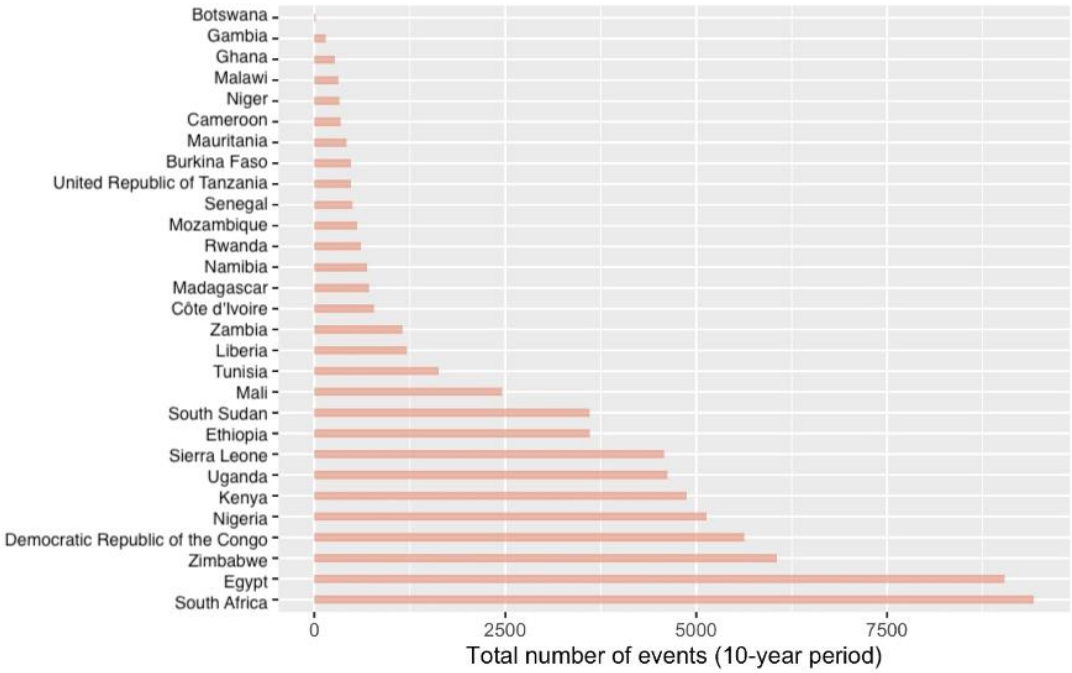


Source: Authors' own calculations.

Figure 2 depicts an overview of conflict intensity at the national level, calculated as the number of conflict events registered in the countries of the study in the ten years preceding the survey. South Africa, Egypt, Zimbabwe, the Democratic Republic of the Congo (DRC) and Nigeria have had the most armed conflict events reported in the ten years preceding the survey. The types of conflict event vary greatly across countries (Figure 3). South Africa has

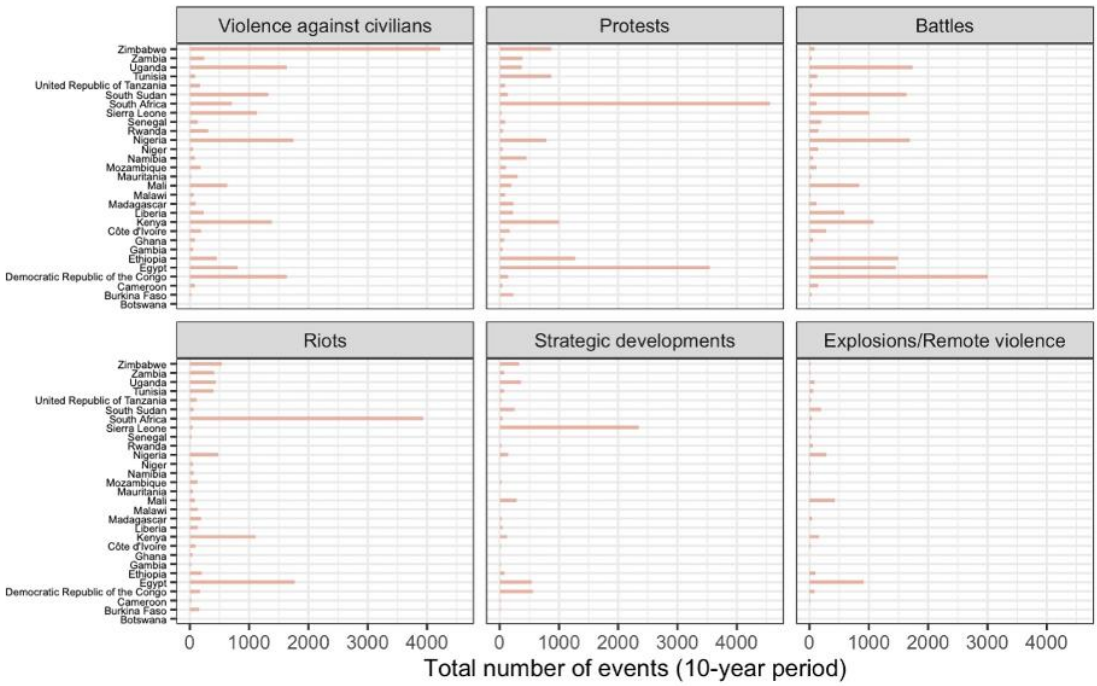
experienced the most riots and protests in the sample, while Zimbabwe has seen the most violent incidents reported against civilians. The DRC has had the most battles, while Sierra Leone is reported to have had more strategic developments.

Figure 2. Conflict intensity in the 10 years before the survey in the countries of the study



Source: Authors' own calculations based on ACLED data.

Figure 3. Typologies of armed conflict by country



Source: Authors' own calculations based on ACLED data.

4.2 Labour-force participation, hours worked and income

We found that recent conflict exposure had little influence on being in the labour force or not (Table 2). However, as expected, gender matters greatly. Across model specifications, women were about 22 percentage points less likely to be in the labour force than men. Notably, conflict exposure slightly increased that difference, by about 3 percentage points. These results are robust when controlling for previous occurrence of conflicts 12–24 months and 24–36 months before a survey took place (columns 5 and 6, Table 2). The robustness emphasizes that we observed immediate impacts of conflict exposure and did not capture differences that are driven by a more "chronic" conflict situation.

Table 2. Exposure to local conflict and labour-force participation

	Outcome: Being in the labour force (working age)					
	(1)	(2)	(3)	(4)	(5)	(6)
Conflict last 12 months	−0.027 (0.016)		0.013 (0.016)	0.001 (0.016)	−0.001 (0.017)	0.001 (0.016)
Female		−0.217*** (0.001)	−0.232*** (0.001)	−0.209*** (0.024)	−0.209*** (0.024)	−0.209*** (0.024)
Conflict 12 months x Female				−0.027*** (0.002)	−0.027*** (0.002)	−0.027*** (0.002)
Conflict between 12 to 24 months					0.054** (0.018)	
Conflict between 24 to 36 months						0.033 (0.027)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	0.582	0.582	0.582	0.582	0.582	0.582
# observations	858 704	858 704	858 704	858 704	858 704	858 704
Adj. R^2	0.090	0.085	0.090	0.091	0.091	0.091

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Table 3 shows that exposure to local conflict strongly reduced the total hours worked for both men and women (columns 1–3), but the reduction was significantly stronger among men (columns 4–6). Exposure to local conflict in the previous year reduced working hours by about 6.8 hours for women and 8 hours for men (column 4). Controlling for the occurrence of conflict in previous periods (columns 5 and 6), we again found that the differences remain essentially unchanged and are not driven by underlying "chronic" conflict conditions.

Table 3 Exposure to local conflict and total hours worked (across sectors)

	Hours worked total (in labour force)					
	(1)	(2)	(3)	(4)	(5)	(6)
Conflict last 12 months	−7.578*** (0.652)		−7.433*** (0.642)	−8.04*** (0.646)	−7.902*** (0.652)	−7.284*** (0.692)
Female		−5.609*** (0.052)	−5.810*** (0.055)	−6.832*** (0.125)	−6.832*** (0.125)	−6.832*** (0.125)
Conflict 12 months x Female				1.271*** (0.139)	1.272*** (0.139)	1.271*** (0.140)
Conflict between 12 to 24 months					−1.591 (1.033)	
Conflict between 24 to 36 months						3.254** (1.071)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	42.58	42.58	42.58	42.58	42.58	42.58
# observations	433 717	433 717	433 717	433 717	433 717	433 717
Adj. R^2	0.001	0.026	0.029	0.029	0.029	0.029

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Table 4 presents results on earned income. As documented in contexts around the world, we observed a strong gender gap. The estimated difference of about USD 36 (columns 2 and 3) is sizeable, given a mean income of about USD 104 among those in the labour force. Notably, the gender gap in income was much larger in the presence of conflict. While only marginally statistically significant, the interaction was strong in economic terms: conflict increased the gender gap by USD 26. Combined with our results on hours worked, these estimates suggest an

important finding: the conflict-induced reduction in hours worked was less pronounced among women than men, but the reduction in income was stronger among women. This finding raises the question of the role of the sector of employment, which we study in the next section.

Table 4. Exposure to local conflict and earned income in USD per month (in labour force)

	Earned income in USD per month (in labour force)					
	(1)	(2)	(3)	(4)	(5)	(6)
Conflict last 12 months	10.933 (80.737)		11.777 (80.732)	22.797 (80.962)	25.188 (82.407)	28.542 (86.763)
Female		−35.815*** (5.332)	−37.187*** (5.687)	−15.788 (13.133)	−15.788 (13.133)	−15.788 (13.133)
Conflict 12 months x Female				−26.335* (14.568)	−26.331* (14.568)	−26.340* (14.568)
Conflict between 12 to 24 months					−20.241 (130.078)	
Conflict between 24 to 36 months						−26.982 (146.499)
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	103.92	103.92	103.92	103.92	103.92	103.92
# observations	327 988	327 988	327 988	327 988	327 988	327 988
Adj. R^2	0.001	0.001	0.001	0.001	0.001	0.001

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

4.3 Sector of employment

In-depth understanding of the gendered employment impacts of conflicts requires studying impacts on different sectors of production separately. We focused on the agriculture sector, in which 45 percent of those in the labour force were employed, but also studied the secondary and tertiary sector. Local conflict increased engagement in the agriculture sector by about 10 percentage points. This effect was significantly stronger among women, at about 13 percentage points compared with about 8 percentage points among men (Table 5).

Table 5. Exposure to local conflict and participation in agriculture

	Participation in agriculture					
	(1)	(2)	(3)	(4)	(5)	(6)
Conflict last 12 Months	0.105*** (0.015)		0.104*** (0.015)	0.083*** (0.016)	0.083*** (0.016)	0.067*** (0.017)
Female		0.005*** (0.001)	0.003*** (0.001)	−0.033*** (0.002)	−0.033*** (0.002)	−0.033*** (0.002)
Conflict 12 months x Female				0.046*** (0.003)	0.046*** (0.003)	0.046*** (0.003)
Conflict between 12 to 24 months					0.381*** (0.024)	
Conflict between 24 to 36 months						0.070** (0.026)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	0.448	0.448	0.448	0.448	0.448	0.448
# observations	540 817	540 817	540 817	540 817	540 817	540 817
Adj. R^2	0.0294	0.0291	0.0295	0.0299	0.0303	0.0303

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Looking at hours worked in agriculture, Table 6 documents a similar pattern to that for hours worked across sectors: the conflict-induced reduction in hours worked was stronger among men. Conflict decreased hours worked in agriculture by about 5.3 hours per week among men and by about 4.1 hours per week for women (column 4).

Table 6. Exposure to local conflict and hours worked in agriculture

	Hours worked per week in agriculture (in labour force)					
	(1)	(2)	(3)	(4)	(5)	(6)
Conflict last 12 months	−4.450*** (0.819)		−4.788*** (0.805)	−5.289*** (0.809)	−5.421*** (0.811)	−5.100*** (0.868)

Female		−4.831*** (0.077)	−5.884*** (0.089)	−6.736*** (0.172)	−6.736*** (0.172)	−6.736*** (0.172)
Conflict 12 months x Female				1.164*** (0.201)	1.163*** (0.201)	1.165*** (0.201)
Conflict between 12 to 24 months					3.576* (1.432)	
Conflict between 24 to 36 months						−0.735 (1.228)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	37.26	37.26	37.26	37.26	37.26	37.26
# observations	163 273	163 273	163 273	163 273	163 273	163 273
Adj. R^2	0.020	0.020	0.032	0.039	0.039	0.040

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

The association of conflicts and the reduction of hours worked was greatest for the secondary sector. As Table 7 shows, local conflict resulted in a reduction of more than 10 hours worked per week for men, about twice as much as in the primary sector. For women, the trend was similar, with a reduction of 8 hours per week worked in industry, which was about twice as high as for the agriculture sector.

Table 7. Exposure to local conflict and hours worked in industry

	Hours worked per week in industry (in labour force)					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Conflict last 12 months	−11.033*** (1.604)		−9.250*** (1.587)	−10.050*** (1.593)	−9.726*** (1.633)	−9.776*** (1.718)
Female		−5.769*** (0.077)	−5.623*** (0.145)	−7.493*** (0.354)	−7.493*** (0.354)	−7.493*** (0.354)
Conflict 12 months x Female				2.245*** (0.388)	2.247*** (0.388)	2.245*** (0.388)
Conflict between 12 to 24 months					−2.370* (2.634)	

Conflict between 24 to 36 months						−1.305 (3.076)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	45.20	45.20	45.20	45.20	45.20	45.20
# observations	163 273	163 273	163 273	163 273	163 273	163 273
Adj. R^2	0.0169	0.0162	0.0181	0.0185	0.0185	0.0185

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

The magnitude of the relationship between conflicts and reduced hours worked in the tertiary sector was between that observed in the primary and secondary sectors. As shown in Table 8, men living in a conflict-affected area in the previous 12 months lost about 7 hours of work per week, which was consistent with the overall figure for all sectors. The trend for women was similar to the overall figure, with a reduction of nearly 6 hours worked per week in services.

Table 8. Exposure to local conflict and hours worked in services

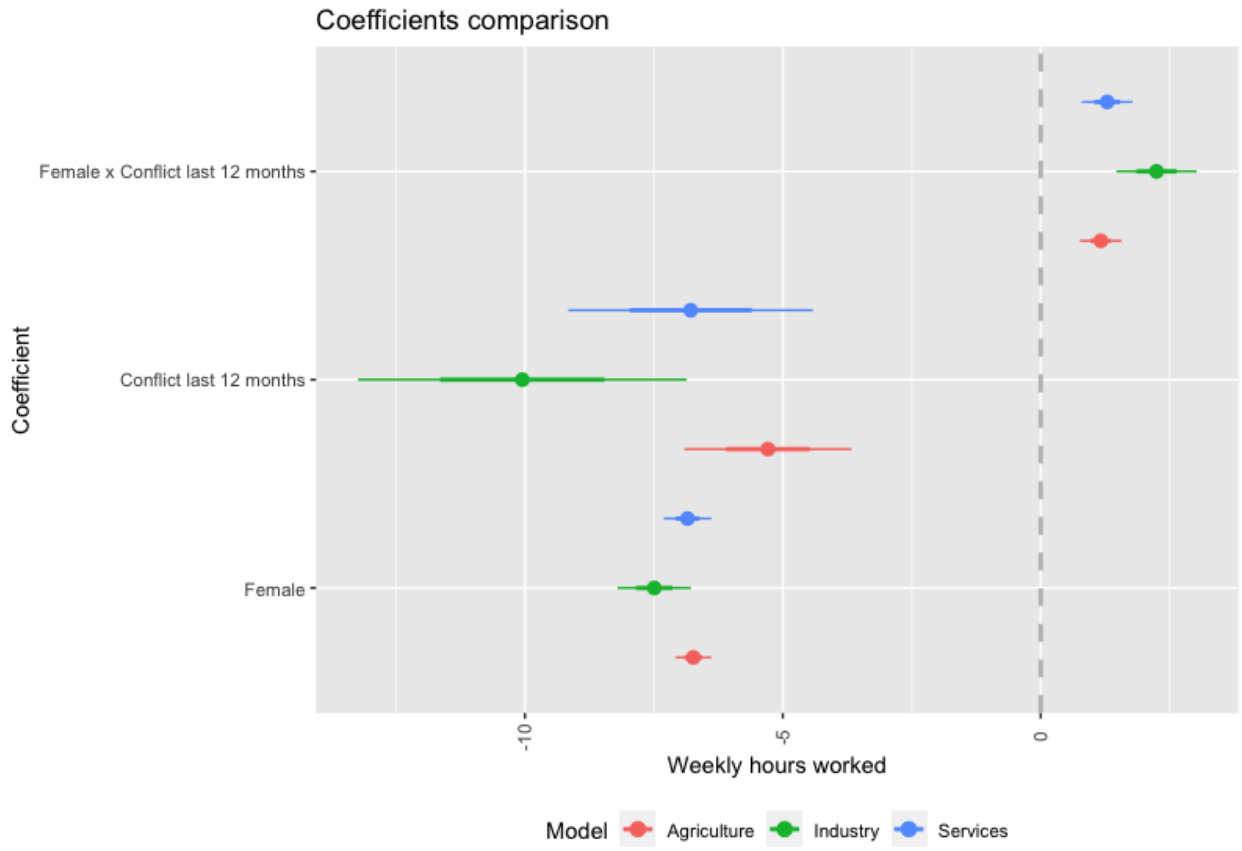
	Hours worked per week in services (in labour force)					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Conflict last 12 months	−6.576*** (1.191)		−6.034*** (1.175)	−6.786*** (1.183)	−6.266*** (1.207)	−5.374*** (1.260)
Female		−6.030*** (0.083)	−5.729*** (0.083)	−6.874*** (0.230)	−6.874*** (0.230)	−6.874*** (0.230)
Conflict 12 months x Female				1.288*** (0.247)	1.288*** (0.247)	1.288*** (0.247)
Conflict between 12 to 24 months					−3.968* (1.800)	
Conflict between 24 to 36 months						−7.008** (2.145)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes

Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	46.37	46.37	46.37	46.37	46.37	46.37
# observations	163 273	163 273	163 273	163 273	163 273	163 273
Adj. R^2	0.003	0.029	0.031	0.033	0.031	0.031

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. . (*Source*: Authors' own calculations.)

Figure 4 summarizes these results by showing the coefficient across sectors of production. In agriculture, conflict-related changes were the least elastic with a reduction in hours worked that was about half that observed in the secondary sector. The gender effect also seems to be less pronounced, with the interaction coefficient between conflicts and females taking a lower value for the primary sector than for the secondary sector. The effects for the tertiary service sector fall between those recorded in agriculture and those recorded in industry.

Figure 4. Exposure to local conflict and hours worked in services



Note: Lines indicate 95% and 99% confidence intervals. . (*Source*: Authors' own calculations.)

4.4 Summary

Table 9 summarizes the results presented in the main analysis by showing, for each outcome examined, the direction and statistical significance of the main coefficients (conflict in the past 12 months and being female) and the interaction term (conflict x being female).

Table 9. Summary of impacts of conflict in past 12 months

Outcome	Conflict	Female	Conflict*female
Labour-force participation	n.s.	–	–
Hours worked total (in labour force)	–	–	+
Hours worked in agriculture (in labour force)	–	–	+
Hours worked in industry (in labour force)	–	–	+
Hours worked in services (in labour force)	–	–	+
In agriculture	+	+	+
Earned income in USD per month (in labour force)	n.s.	–	–

Note: Rows are separate models. Each cell indicates the direction and statistical significance of an effect. "+" and "–" denote significance at the 99.9% level, "n.s." denotes non-significance at this level. (*Source*: Authors' own calculations.)

Source: Authors' own calculations.

5 Heterogeneity

5.1 Persistence over time

A key question raised by the literature is how persistent conflict-induced shocks to economic activity are over time. There is the hypothesis that conflict impacts tend to fade over time as the labour market resets to preconflict levels. To analyse longer-term impacts, we linked local conflict events that happened 24 to 36 months before the survey with the key indicator of hours worked by men and women. We then tested how these impacts vary by the occurrence of ensuing conflict in the 24 months before the survey. Being subjected to sustained shocks over time could have a very different effect than a one-time shock.

Local conflict appeared to reduce the total hours worked two years later by about 7 hours per week, with the effect being slightly more pronounced among men (Table 10, columns 1 to 4). The results shown in columns 5 and 6 show that this effect strongly depended on conflict intensity in the following two years. When there was no conflict in the following two years, the reduction was about 10 hours per week. By contrast, the reduction two years later was only about 3 hours per week when there was conflict in between.

These results are not consistent with conflict impacts fading away when no conflict ensues. The fact that the longer-term impacts were smaller when there was conflict suggests that labour markets adapt to ongoing conflict, which weakens impacts. In contrast, when no conflict ensues, longer-term impacts appear to be strong and persistent.

Table 10. Persistence of conflict impacts and total hours worked

	Hours worked total (in labour force)					
	(1)	(2)	(3)	(4)	(5) Subsample: Conflict in past 24 months	(6) Subsample: No conflict in past 24 months
Conflict 24–36 months ago	−6.999*** (1.014)		−7.011*** (0.999)	−7.382*** (1.001)	−3.270*** (1.054)	−10.314*** (1.073)
Female		−5.609*** (0.052)	−5.812*** (0.055)	−6.321*** (0.093)	−5.549** (0.113)	−6.319*** (0.093)
Conflict 24–36 months x Female				0.787*** (0.116)	0.037 (0.133)	0.035 (0.133)
Individual characteristics	yes	yes	yes	yes	yes	yes

	Hours worked total (in labour force)					
	(1)	(2)	(3)	(4)	(5) Subsample: Conflict in past 24 months	(6) Subsample: No conflict in past 24 months
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	42.58	42.58	42.58	42.58	42.58	42.58
# observations	361 601	361 601	361 601	361 601	314 178	47 423
Adj. R^2	0.001	0.025	0.029	0.028	0.027	0.026

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

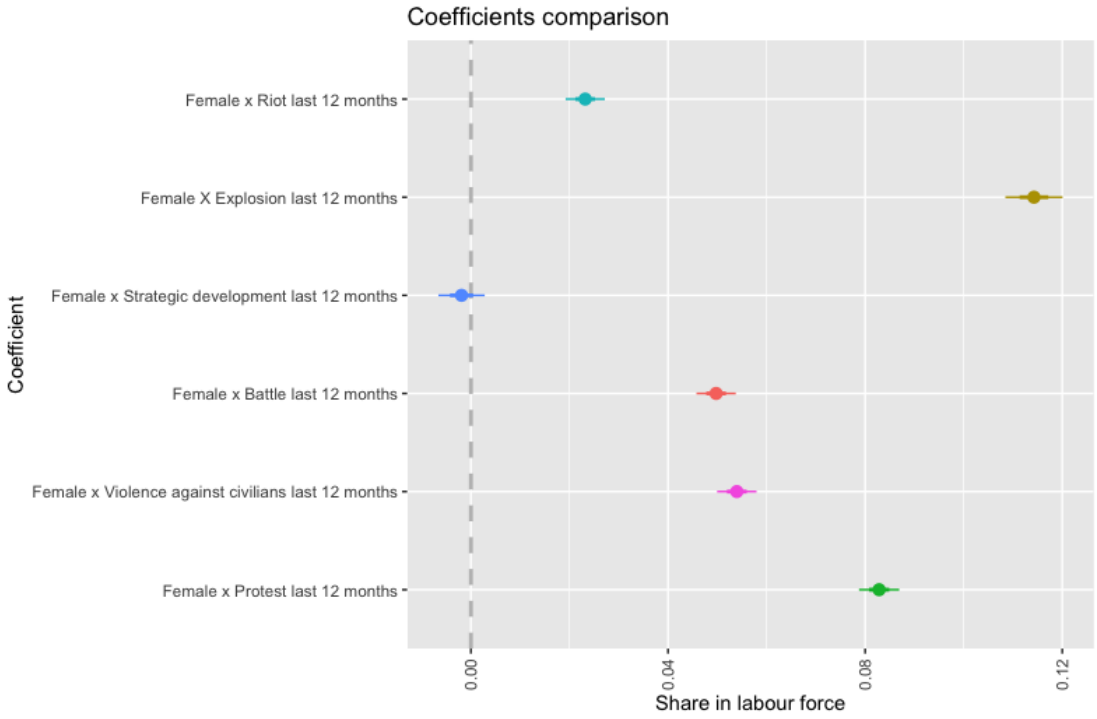
5.2 Disaggregation by conflict type

The effects described so far refer to different types of conflict events aggregated together. In this section, we study heterogeneity across types of conflict events and their impacts on the four main outcomes discussed above: labour-market participation, total hours worked, earned income and participation in agriculture. The event types include battles, violence against civilians, explosions/remote violence, riots, protests and strategic developments (see Appendix A2 for details). Here, we focus on the interactive effects of the occurrence of a given type of conflict event in the last 12 months and being female. Complete tables for the different types of events are provided in the Appendix.

Figure 5 shows the interactive effects of different types of conflict events and being female on labour-market participation. Except for strategic development events, our results confirm the main finding of stronger negative impacts of conflict on females for each category of conflict. At the same time, the strength of the interactive effect varies substantially across conflict types. Incidences of explosion/remote violence had the largest impact, increasing the main gender gap by about 11 percentage points. Protests increased the gender gap by about 8 percentage points, battles and violence towards civilians by about 5 percentage points and riots by about 2 percentage points.

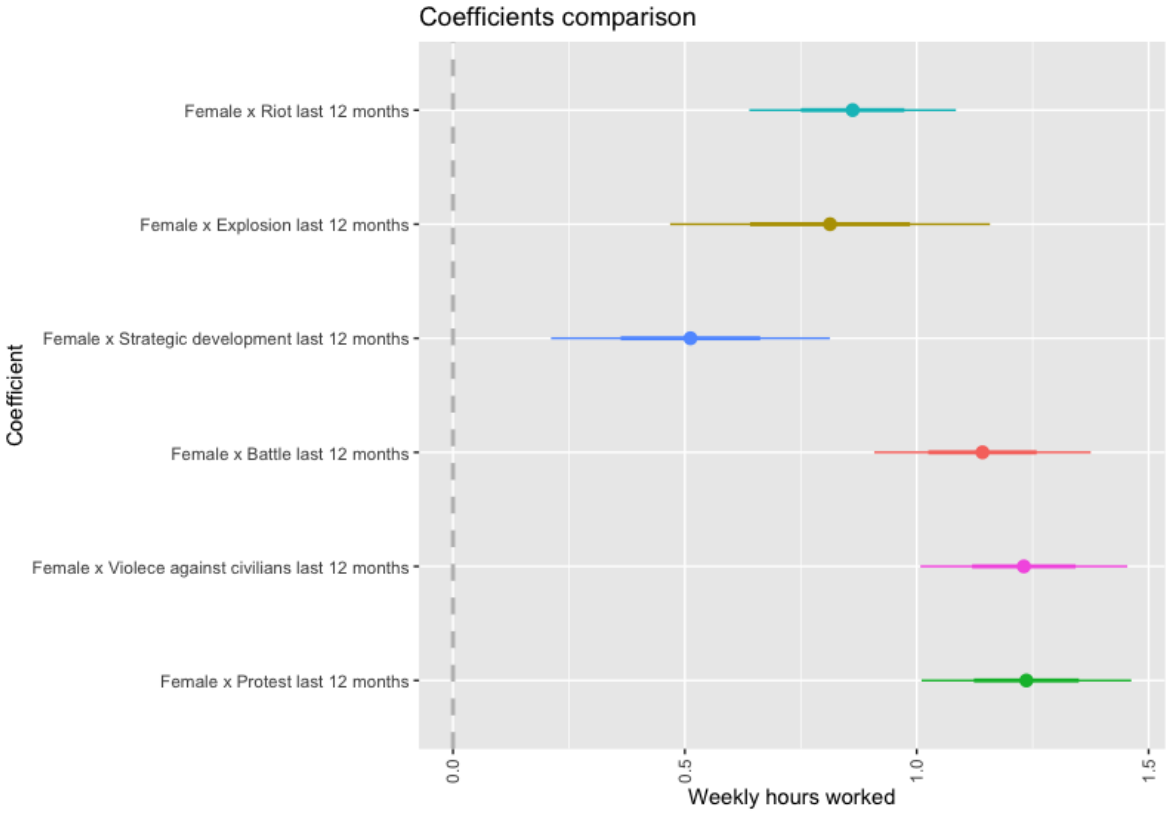
Figure 6 presents estimates of the interactive effects of different types of conflict event and being female on hours worked per week. As with labour-market participation, we observed very similar results for each conflict category as for the total measure of conflict: each conflict category decreased the gender gap in hours worked per week. The differences across conflict categories were less sizeable than for labour-force participation.

Figure 5. Different types of conflict and labour-force participation



Note: Rows are separate models; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

Figure 6. Different types of conflict and total hours worked (across sectors)

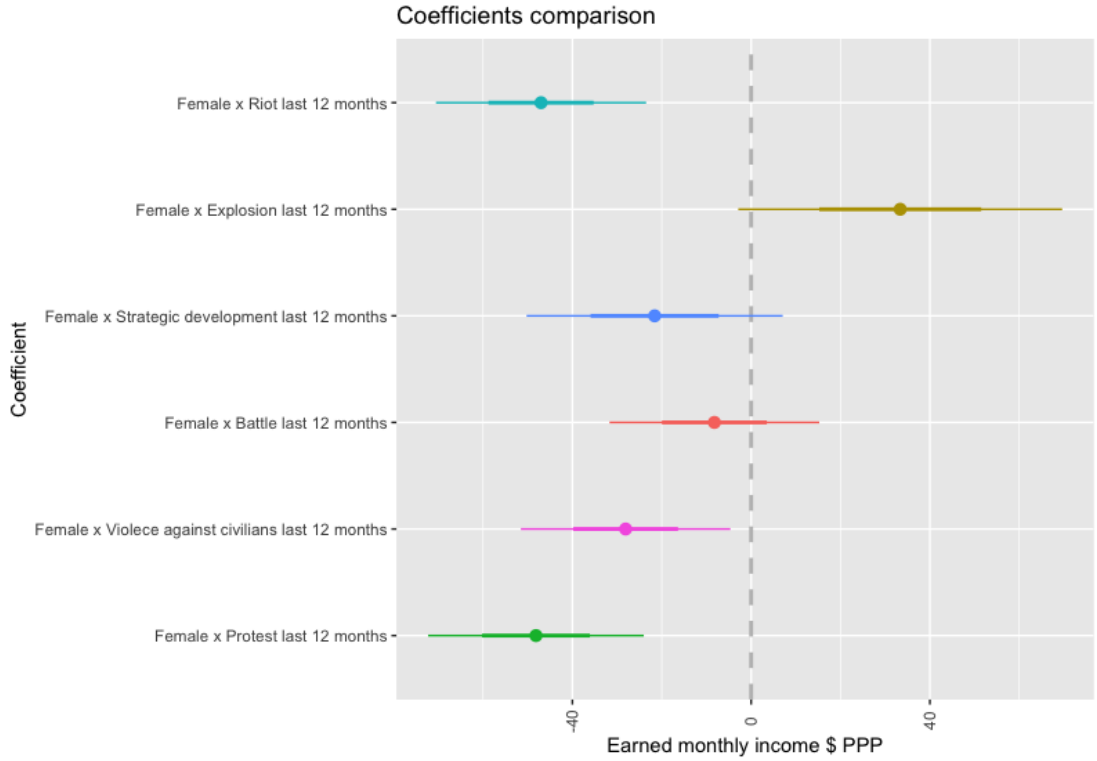


Note: Rows are separate models; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

Battles, violence against civilians and protests reduced the gender gap in hours worked by about 1.2 hours, riots and explosions by about 0.8 hours and strategic development by about 0.5 hours.

Figure 7 illustrates the interactive effects of different types of conflict events and being female on earned income. As in the results for the aggregate conflict measure, we found that women's income was disproportionately affected by conflict events, widening the income gap between men and women. Protests and riots increase the gender gap in income by more than USD 40 per month (at purchasing power parity), violence against civilians by about USD 30 per month while battles, explosions and strategic development events did not have a statistically significant effect at the 99 percent confidence level. Notably, we observed that explosions *reduced* the gender gap in income by about USD 30 per month, statistically significant at the 95 percent confidence level.

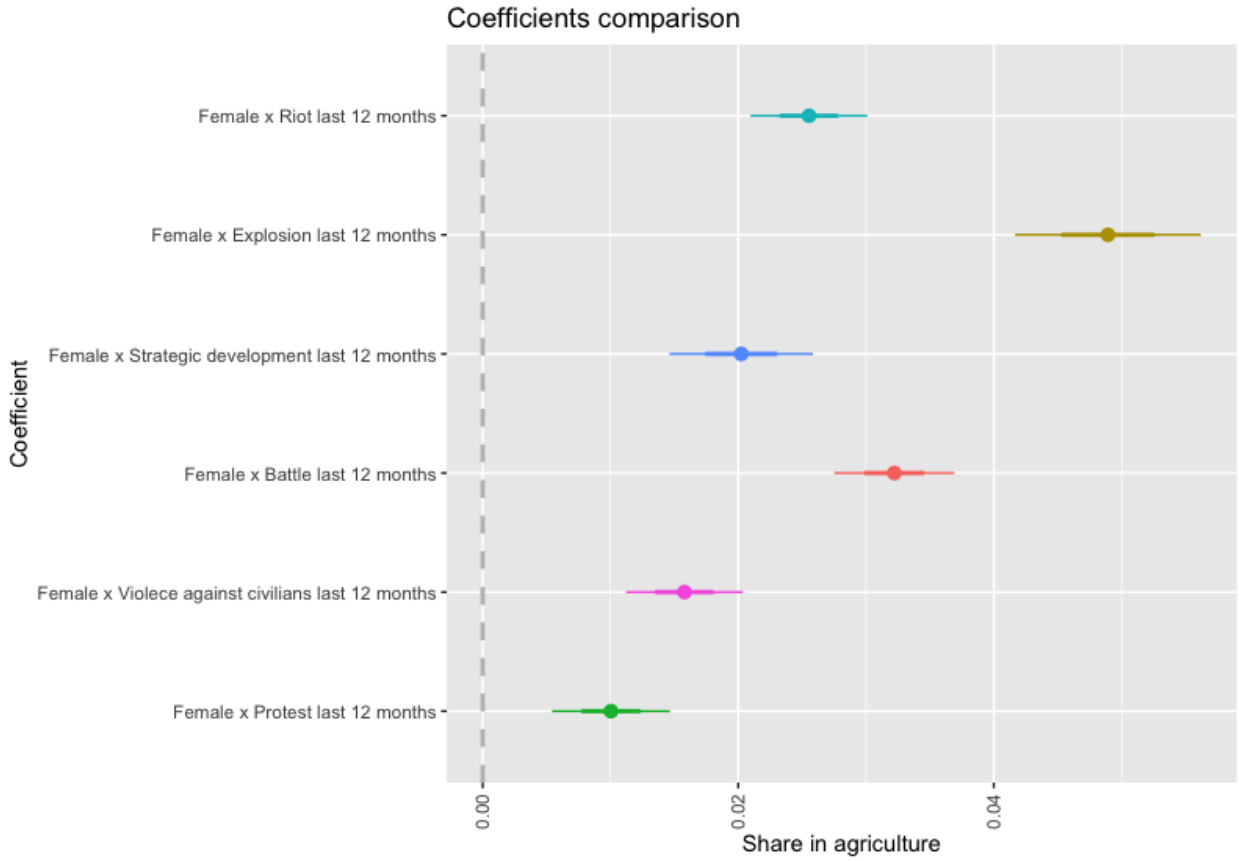
Figure 7. Conflict type and female monthly earned income



Note: Rows are separate models; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

Finally, in Figure 8 we show results on the interactive effects of different types of conflict events and being female on the likelihood of being engaged in agriculture. The interaction coefficients are positive for all event types, indicating that in any type of conflict the increase in work in agriculture is more pronounced among women than among men. Again, the magnitude of this association varies across event types: by about 5 percentage points for explosions, by between 2 and 4 percentage points for battles, riots and strategic development events, and by between 1 and 2 percentage points for violence against civilians and protests.

Figure 8. Conflict type and female share in agriculture



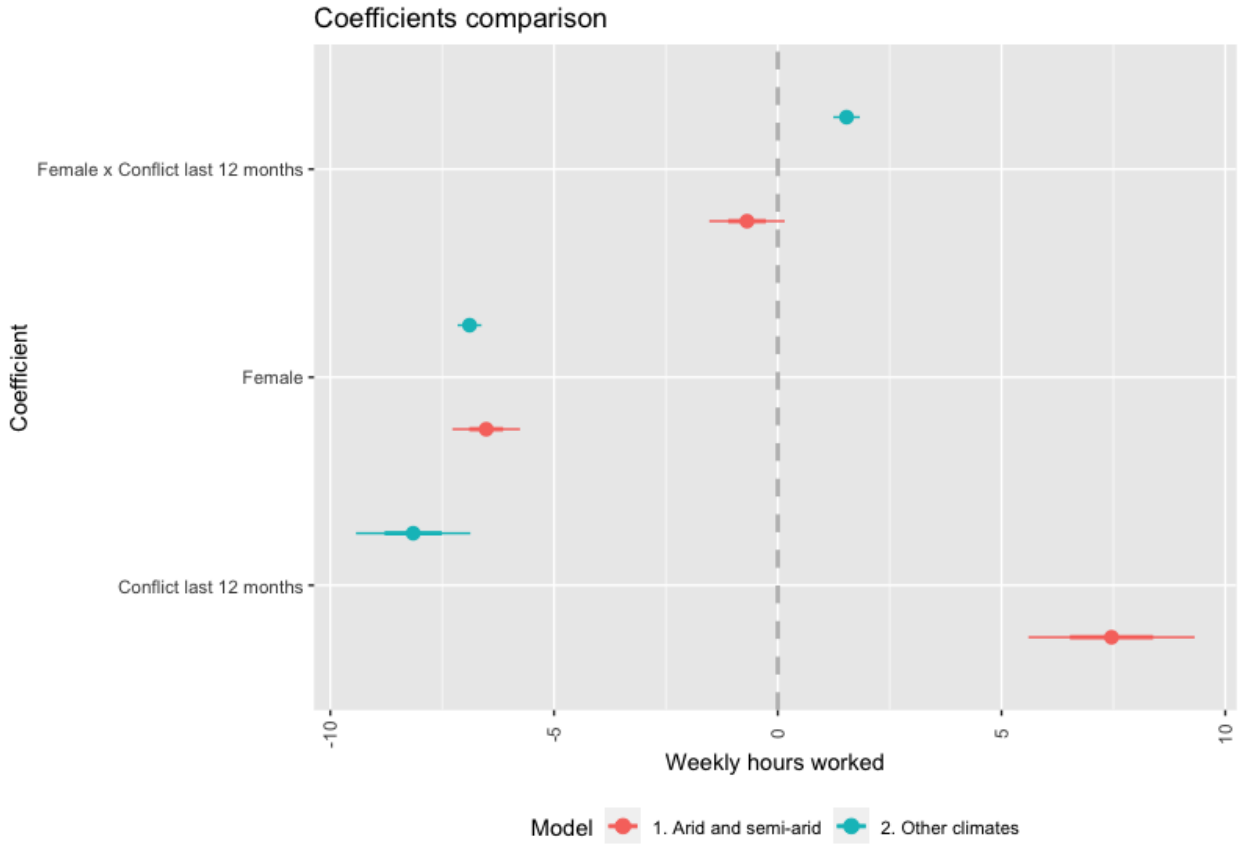
Note: Rows are separate models; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

5.3 Disaggregation by agroecological conditions

Countries in our sample span a wide range of agroecological zones, including tropical, subtropical and arid areas. The potential for and productivity of agricultural activities varies significantly across these zones. These systematic differences likely affect the relationship between conflict and agrifood systems. We therefore categorized the countries in our sample into two groups according to their main climatic type (Kottek *et al.*, 2006): those with predominantly arid and semi-arid conditions (Egypt, Mali, Mauritania, Namibia, the Niger and Tunisia) and those with predominantly humid and subhumid climates (all other countries in the sample).

Figure 9 shows that the impact of local conflict exposure on the number of hours worked per week varies between the two groups. For the average effect we had found that exposure to local conflict strongly reduced the total hours worked for both men and women, but the reduction was significantly stronger among men. Figure 9 shows that this finding is driven by countries in humid and semi-humid zones. In contrast, local conflict was associated with an increase in the hours worked per week in arid and semi-arid countries, with no significant variation by gender.

Figure 9. Conflict and hours worked across agroecological conditions

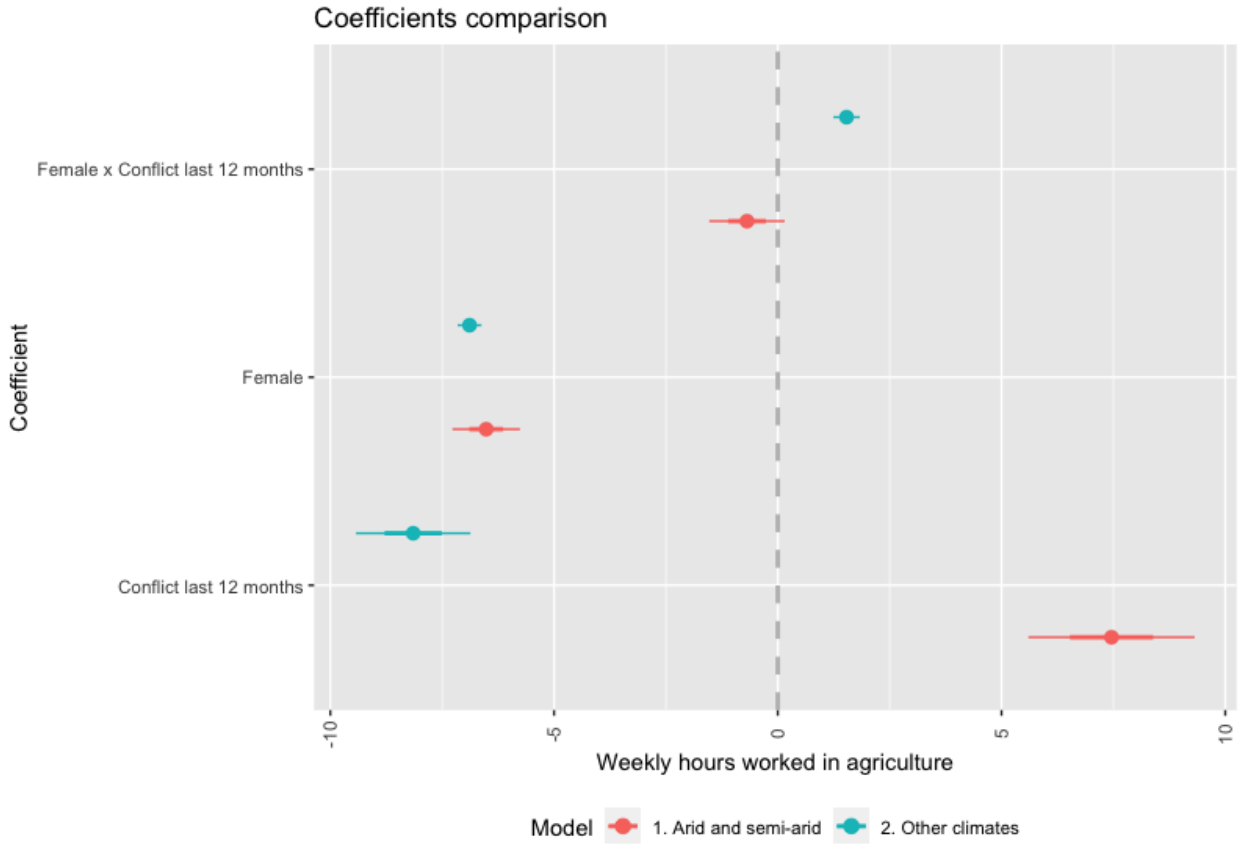


Note: The figure presents the point estimate comparison for each coefficient in different model specifications; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

This structural difference becomes even more pronounced when we focused on weekly hours worked in agriculture, where local conflict exposure was associated with an increase of about 16 hours of work in agriculture (Figure 10).

These results suggest that the gendered impact of conflict and agrifood systems is partially shaped by agroecological conditions. However, it is important to note that regions that differ in agroecological conditions differ also in other dimensions that might affect the link between conflict and agrifood systems. To take one additional step in this direction, we grouped settings based on the total share of women working in agriculture.

Figure 10. Conflict and hours worked in agriculture across agroecological conditions



Note: The figure presents the point estimate comparison for each coefficient in different model specifications; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

5.4 Disaggregation by female work in agriculture

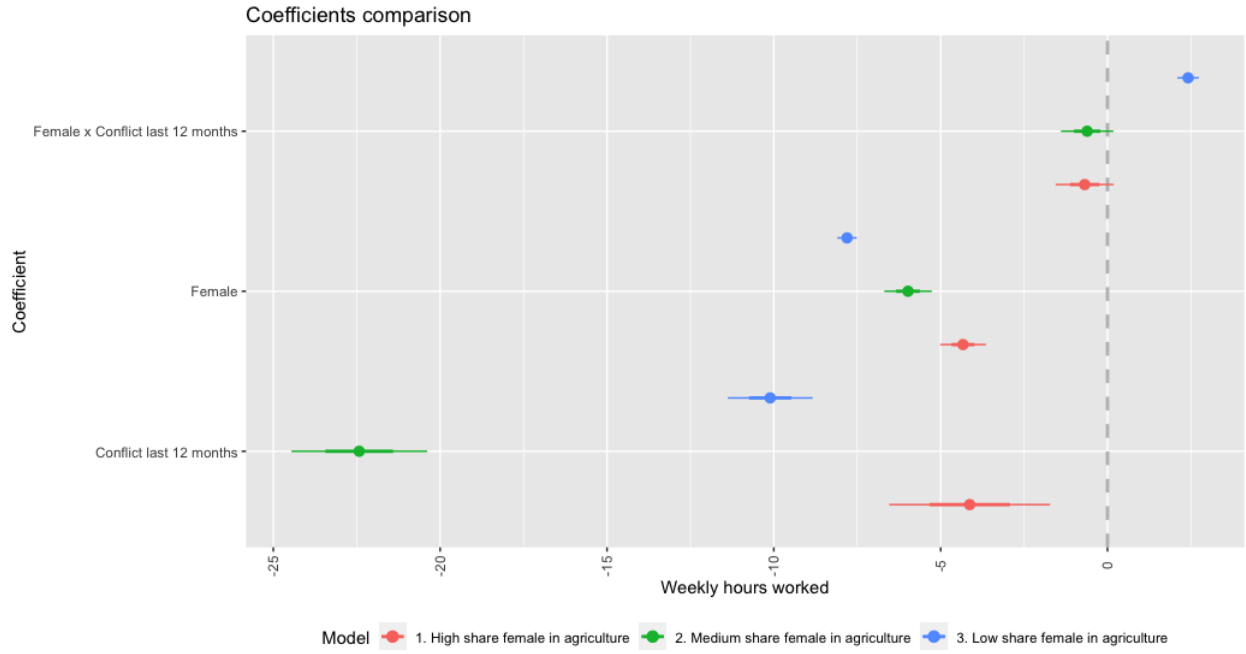
Categorizing settings in terms of the share of female participation in the agriculture sector (at a national level) not only captures heterogeneity based on the scope and productivity of agriculture but also other factors such as social norms and the importance of agriculture for the national economy. As shown in Figure 1, there is substantial variation in the participation of working women in agriculture between the countries taken into consideration, with rates ranging from as little as 20 percent to up to 60 percent.

Based on the pattern in Figure 1, we split the sample into three groups corresponding to relatively high, medium and low female participation in agriculture. In absolute figures, these categories represent shares of female participation in agriculture above 51 percent (high), between 38 and 51 percent (medium) and below 38 percent (low).

As shown in Figure 11, the link between local conflict exposure on the number of hours worked per week varied with the aggregate level of female participation in agriculture. Across the spectrum, conflict has a negative impact on the weekly hours worked, which is particularly strong for a "medium" share of female participation in

agriculture. In our main results, we had documented that this reduction is significantly stronger among men. Interestingly, we only observed this pattern for settings with low female participation in agriculture. When female participation in agriculture is at medium or high levels, the conflict-based reduction in hours worked does not differ significantly between men and women.

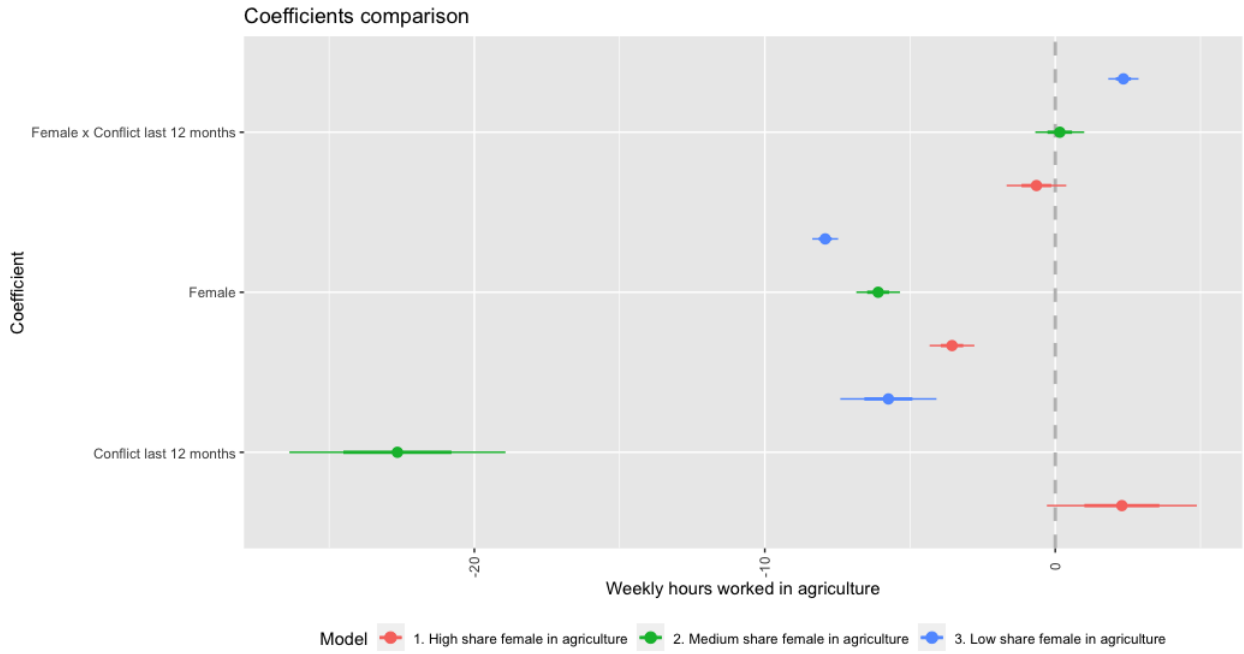
Figure 11. Conflict and hours worked across levels of female participation in agriculture



Note: The figure presents the point estimate comparison for each coefficient in different model specifications; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

A similar pattern emerges when we focus on weekly hours worked in agriculture (Figure 12): the magnitude of conflict impacts was greatest for economies with a medium share of female participation in agriculture and the decrease was significantly smaller for women in economies with a low share of female participation in agriculture. Notably, local conflict exposure was not linked with a significant decrease in the weekly hours worked in agriculture in economies where female participation in agriculture was high: if anything, conflict was associated with an increase in hours worked in agriculture in these contexts (significant at the 95 percent level).

Figure 12. Conflict and hours worked in agriculture across levels of female participation in agriculture



Note: The figure presents the point estimate comparison for each coefficient in different model specifications; lines indicate 95% and 99% confidence intervals. (*Source*: Authors' own calculations.)

These results suggest that in settings where the agriculture sector employs few women in relative terms, females partially "absorb" conflict-induced losses in total hours worked by working more hours overall and specifically in agriculture. By contrast, when there is high female participation in agriculture (greater than 50 percent of female employment), conflict impacts on economic activity and their gendered dimensions tend to vanish.

6 Conclusions

Our results based on microdata from 29 countries confirm previous findings documenting gender gaps in labour-market outcomes in developing countries (e.g. Huyer, 2016) and a general worsening of economic outcomes in situations of conflict (e.g. de Groot *et al.*, 2022). Building on these results, we provide cross-country evidence that the gender gaps in labour-market outcomes in agriculture and other sectors are larger in situations of conflict, for example in terms of labour-force participation and earned income. At the intensive margin, our analysis reveals some, perhaps surprising, interactions between being female and conflict exposure for each sector, as the decrease in the average number of total hours worked in the presence of conflict is significantly weaker for women than for men. However, it is important to note that even though these results suggest a reduction of the gender gap due to conflict, it is not due to improvements for women but rather stems from challenges that affect men more. In addition, women's higher participation in agriculture is exacerbated in situations of conflict.

Combined with the observation that the income gap widens in conflict situations, these results stress that conflict has particularly detrimental economic implications for women in agrifood systems. Specifically, women appear to still work considerable numbers of hours in situations of conflict, but they are shifted to towards activities with relatively low monetary returns, primarily in agriculture. A plausible interpretation is that the burden of smoothing consumption and securing survival in conflict situations falls disproportionately on women. More generally, our findings also emphasize that the reactions of labour markets and agrifood systems to conflict are less about abandoning economic activities but more about relative changes in needs, opportunity and time reallocation between women and men across activities.

Lastly, we document that impacts of conflict two years later are stronger when there is no conflict in the period in between. When further conflict ensues during that period, impacts two years later are much weaker. This result is in line with the idea that labour markets absorb conflict shocks and adapt to the conflict setting. It is not consistent with the idea that one-off conflict shocks have strong impacts that fade away over time.

Taken together, all our findings emphasize that violent conflict is a key driver of structural societal change and a key impediment to achieving Sustainable Development Goal 5 (UN Women and UNDESA, 2022).

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Appendices

A1 Additional tables and figures

Table A1. Type of event occurred in the previous 12 months and labour-market participation

	In labour force (working age)					
	(1) Protests	(2) Violence against civilians	(3) Battles	(4) Strategic developments	(5) Explosions	(6) Riots
Conflict last 12 months	−0.153*** (0.015)	0.103*** (0.007)	0.226*** (0.015)	0.148*** (0.015)	−0.222*** (0.015)	0.128*** (0.008)
Female	−0.170*** (0.001)	−0.190*** (0.001)	−0.202*** (0.001)	−0.223*** (0.001)	−0.207*** (0.001)	−0.209*** (0.001)
Female x conflict last 12 months	−0.082*** (0.002)	−0.053*** (0.002)	−0.049*** (0.002)	−0.001 (0.002)	−0.114*** (0.002)	−0.023*** (0.001)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	0.582	0.582	0.582	0.582	0.582	0.582
# observations	858 704	858 704	858 704	858 704	858 704	858 704
Adj. R^2	0.088	0.087	0.087	0.087	0.086	0.086

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Table A2. Type of conflict event in the previous 12 months and total hours worked

	Hours worked total (in labour force)					
	(1) Protests	(2) Violence against civilians	(3) Battles	(4) Strategic developments	(5) Explosions	(6) Riots
Conflict last 12 months	−3.650*** (1.009)	- 1.385** (0.450)	2.421 (1.009)	3.672*** (0.898)	1.450 (1.010)	1.974*** (0.552)
Female	−6.344*** (0.086)	−6.270*** (0.081)	−6.020*** (0.069)	−5.704*** (0.060)	−5.717** (0.059)	−6.045*** (0.078)
Female x conflict last 12 months	1.236*** (0.113)	1.230*** (0.111)	1.141*** (0.116)	0.512*** (0.150)	0.813*** (0.172)	0.861*** (0.111)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	42.58	42.58	42.58	42.58	42.58	42.58
# observations	361 601	361 601	361 601	361 601	361 601	361 601
Adj. R^2	0.026	0.026	0.026	0.027	0.026	0.026

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Table A3. Type of conflict event in the previous 12 months and earned income

	Earned income in USD per month (in labour force)					
	(1) Protests	(2) Violence against civilians	(3) Battles	(4) Strategic developments	(5) Explosions	(6) Riots
Conflict last 12 months	47.269 (117.269)	19.278 (51.463)	−18.145 (117.267)	21.799 (102.555)	−37.394 (120.243)	18.879 (63.581)
Female	−7.065 (9.567)	−21.572 (8.796)	−33.862 (7.694)	−32.915*** (6.527)	−41.280*** (6.183)	−10.503 (8.888)
Female x conflict last 12 months	−48.147*** (12.064)	−28.083* (11.720)	−8.221 (11.735)	−21.590 (14.329)	33.364* (18.122)	−47.018*** (11.757)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	103.92	103.92	103.92	103.92	103.92	103.92
# observations	327 988	327 988	327 988	327 988	327 988	327 988
Adj. R^2	0.001	0.001	0.001	0.001	0.001	0.001

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

Table A4. Type of conflict event in the previous 12 months and participation in agriculture

	(1) Protests	(2) Violence against civilians	(3) Battles	(4) Strategic developments	(5) Explosions	(6) Riots
Conflict last 12 months	−0.285*** (0.022)	−0.081*** (0.010)	0.263*** (0.022)	−0.155*** (0.020)	0.018 (0.015)	0.020 (0.022)
Female	0.001 (0.001)	0.001 (0.001)	0.005*** (0.001)	0.002* (0.001)	0.015 (0.012)	0.005*** (0.001)
Female x conflict last 12 months	0.010*** (0.002)	0.015*** (0.002)	0.032*** (0.002)	0.020*** (0.002)	0.048*** (0.003)	0.025*** (0.002)
Individual characteristics	yes	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes	yes
Location fixed effects	yes	yes	yes	yes	yes	yes
Mean of dep. var.	0.448	0.448	0.448	0.448	0.448	0.448
# observations	540 817	540 817	540 817	540 817	540 817	540 817
Adj. R^2	0.029	0.029	0.029	0.029	0.029	0.029

Note: * Significant at the 95% level, ** at the 99% level, *** at the 99.9% level, standard errors in parentheses. (*Source*: Authors' own calculations.)

A2 Conflict event data

We follow ACLED methodology (Raleigh *et al.*, 2010) to categorize the violent events as documented in Table A.5.

Table A5. ACLED events classification

General	Event type	Subevent type
Violent events	Battles	Armed clash
		Government regains territory
		Non-state actor overtakes territory
	Explosions/Remote violence	Chemical weapons
		Air/drone strike
		Suicide bomb
		Shelling/artillery/landmine/IED
		Remote explosive
		Grenade
	Violence against civilians	Sexual violence
		Attack
		Abduction/forced disappearance
Demonstrations	Protests	Peaceful protest
		Protest with intervention
		Excessive force against protesters
	Riots	Violent demonstration
		Mob violence
Non-violent actions	Strategic developments	Agreement
		Arrests
		Change to group/activity
		Disrupted weapons use
		Headquarters or base established
		Looting/property destruction
		Non-violent transfer of territory
		Other

Note: IED – improvised explosive device. (*Source*: Authors' own calculations.)

Battles

Battles are defined as violent interactions between two politically organized armed groups at a particular time and location (ACLED, 2023). Battles can occur between armed and organized state, non-state and external groups and in any combination therein. There is no fatality minimum necessary for inclusion.

Explosions and remote violence

Explosions and remote violence refer to "one-sided violent events in which the tool for engaging in conflict creates asymmetry by taking away the ability of the target to respond" (ACLED, 2023). The tools used in these instances are explosive devices, including, but not limited to, bombs, grenades, improvised explosive devices (IEDs), artillery fire or shelling, missile attacks, heavy machine-gun fire, air or drone strikes or chemical weapons.

Violence against civilians

Violence against civilians is defined as violent events where an organized armed group deliberately inflicts violence upon unarmed non-combatants (ACLED, 2023). By definition, civilians are unarmed and cannot engage in political violence. The perpetrators of such acts include state forces and their affiliates, rebels, militias and external/other forces.

Protests

Protests refer to organized expressions of dissent, grievances or demands by groups of people (ACLED, 2023). These events are non-violent in nature and encompass activities like rallies, marches, sit-ins, strikes and demonstrations. ACLED's focus is on capturing events that do not involve armed force, excluding actions like shootings or bombings. These protests can cover a wide spectrum of issues, including political reforms, social justice, labour rights, environmental concerns, human rights and economic conditions.

Riots

Riots are violent events where demonstrators or mobs engage in disruptive acts, including but not limited to rock throwing, property destruction etc. (ACLED, 2023). Rioters may begin as peaceful protesters or may be intent on engaging in spontaneous and disorganized violence from the beginning of their actions. Contrary to armed groups, rioters do not use sophisticated weapons such as guns, knives or swords. "Crude bombs" (e.g. Molotov cocktails, petrol bombs, firecrackers) may be used in rioting behaviour.

Strategic developments

Strategic developments refer to activities of violent groups that are not themselves recorded as political violence yet may trigger future events or contribute to political dynamics within and across states (ACLED, 2023). Property destruction is the main subtype in this group. This subevent type is used when organized armed groups engage in looting or seizing goods or property other than weapons or weapon systems (in which case the subevent type "Disrupted weapons use" should be used). This can occur during raiding or after the capture of villages or other populated places by armed groups that occur without reported violence.

Armed conflict and gendered participation in agrifood systems: Survey evidence from 29 African countries

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