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Women's Empowerment in Times of Conflict: Evidence from Yemen

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ABSTRACT

Women's Empowerment in Times of Conflict: Evidence from Yemen

This paper studies how female participation in household decision making has been affected by the ongoing civil conflict in the Republic of Yemen in areas under the control of the Internationally Recognized Government. Using a unique survey dataset that tracks households between 2014 and 2021 and a geo-coded data on conflict, we document an increase in women's participation in decision making since the start of the conflict, particularly on decisions related to household purchases and children's education. This is mainly driven by households living in districts with medium intensity conflict as compared to low intensity conflict. This result holds up to a series of robustness checks and is explained by changes in household composition, whereby men are more likely to leave the household in conflict affected districts, leaving women in charge of household decisions.

JEL Classification: D10, D910

Keywords: gender, Yemen, decision making and poverty, conflict and fragility, female-headed households

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I. Introduction

Protracted conflicts can drastically affect the roles that men and women play in the household, the community, and the economy. While women are typically less exposed to the direct effects of war through fighting, battle deaths and forced recruitment, they often face the indirect effects of violent conflict in a more pronounced manner, and more so in the long term (Buvinić, Das Gupta, and Shemyakina 2014; World Bank 2011). Among the lesser-studied indirect effects is the subject of women's autonomy and decision-making role within the household. On the one hand, women are often subject to greater restrictions (on economic activity, mobility, access to education and work, for example) during conflict, often motivated by fears of victimization, and the breakdown of institutions and systems that may hitherto have supported, protected, and encouraged women's autonomy. Simultaneously, in many settings, women take on greater roles in household and community affairs due to changing demographics (as men leave to join armed groups, or suffer fatalities in combat), economic deterioration, or even the lifting of constraints to their autonomy that may operate in peaceful times. For example, in Europe, the military mobilization of males during World War II preceded a large (and sustained) increase in female labor force participation (Acemoglu, Autor, and Lyle 2004), although the suffragette movement had set the stage for female empowerment many years earlier. Which of these effects prevails is ultimately an empirical question that depends on several contextual and structural factors, including the specific dynamics of the conflict in question.

Few studies have examined the effects of long-term exposure to violent conflict on women's decision-making, a key indicator of women's empowerment (examples include studies on the long term effect of the Rwandan genocide). Fewer still have done so during an ongoing conflict (see for example Tandon (2018; La Mattina 2017; Schindler 2010)), as studies on the effects of conflict on women's empowerment have typically been conducted (soon) after the cessation of fighting. As conflicts across the world are increasingly long in duration, it is important to understand societal and household dynamics *during* conflict. Behaviors and norms that emerge during conflict can endure and shape the course of conflict resolution, as well as a post-conflict social compact. Understanding changes in women's decision making during and due to conflict can also inform the priorities for political, development and humanitarian interventions during conflict as well as in a post-conflict milieu, to ensure that any improvements are built upon, or any deteriorations remedied. Such analyses are especially valuable also in settings where women's empowerment and decision-making have traditionally been low.

This paper contributes to this literature by studying how female participation in household decision making has been affected by the ongoing civil conflict in Yemen. Yemen provides an invaluable setting to examine the effects of long-term exposure to conflict on intrahousehold decision-making dynamics in a setting marked by continuing violence, a legacy of strong barriers to women's empowerment, high poverty and economic deprivation, and contested political control. It is also a context marked by very high levels of internal displacement in which several communities have experienced high inflows and/ or outflows of people because of fighting, which in turn can affect societal, demographic and household-level norms around women's decision-making.

Our preliminary results find an increase in intrahousehold women's decision-making since the conflict started in areas under the control of the International Recognized Government in Yemen. Using a difference-in-difference approach that controls for individual and household characteristics, we find that this result is driven by households living in districts with medium intensity conflict as compared to low intensity conflict. This result holds up to a series of robustness checks, and could be explained by changes

in household composition, whereby men are more likely to leave the household in conflict affected districts, leaving women in charge of household decisions. The remainder of the paper is organized as follows. Section 2 provides an overview of the Yemeni context and section 3 presents the conceptual framework. Section 4 discusses data and empirical strategy. Section 5 presents the baseline results, robustness checks and potential channels. Finally, section 6 concludes.

II. Context

Yemen is the poorest country in the Middle East and has been facing systematic deprivations in key dimensions of human wellbeing over decades. According to the World Bank's Human Capital Index (2018), a person born today in Yemen can expect to achieve only 37% of their full productive potential by the time they reach the age of 18, underlining the large scale of unfulfilled potential due to poverty, and low investments in good quality nutrition, health and education services. The vulnerabilities in terms of economic wellbeing and development have been driven and exacerbated by political instability. After the unification of South and North Yemen in 1990, the country was on a path to relatively stable economic and political consolidation for a few decades.

In the 2010s resentment over corruption, unjust representation and rising food prices built up in the Middle East, culminating in the Arab Spring. Yemen was no exception, as years of corruption and the dwindling oil reserves were not enough to maintain the peace in such a fragmented society. Protests began in Sana'a in 2011 and reached a turning point in 2014 when the government removed a series of subsidies. Houthi rebels had been engaged in military confrontation in the North since 2004, but seized the opportunity to make unprecedented territorial gains, forcing the government from Sana'a to Aden. This was followed by Saudi Arabia-led airstrikes over Houthi-controlled territory beginning in 2015, as well as on-the-ground confrontations between the Houthis, Internationally Recognized Government (IRG) forces, as well as other armed groups (such as the AQAP and the STC). Eight years of brutal war have seen different frontlines, shifts in territorial control of areas, and the involvement of several political and armed actors. The De-Facto Authority (DFA), formed by the Houthis, command control of the Northern areas. While the IRG maintain control of parts of southern Yemen, the UAE-backed Southern Transitional Council (STC) and other groups have also been vying for power. In the last year the prospects for peace have been more encouraging than ever, and the fighting has been less intense.

Nonetheless, in addition to the conflict, Yemen has been beset by a series of shocks including the COVID-19 pandemic, a massive depreciation of the Yemeni rial and resulting inflation, natural disasters, and the desert locust crisis of 2020 to name a few. These shocks have had devastating impacts on the lives and wellbeing of Yemenis. Many of these crises are inter-related and are rooted in the ongoing conflict. This includes an unprecedented scale of internal displacement caused by the fighting. To date, 4.3 million Yemenis have been displaced within the country. Overall, the economic conditions of Yemenis are very precarious, and the latest Humanitarian Needs Overview (HNO) indicates that 23.4 million Yemenis are in need of humanitarian assistance, 19 million of whom require food assistance.²

It is estimated that prior to the conflict around 13 percent of the Yemeni workforce was unemployed, but these numbers were substantially higher for youth and women, and masked the inactivity of those who were out of the labor force (ILO 2015). While the male labor force participation rate was 65.4 percent prior to the conflict, this was at 6 percent for women, one of the lowest in the MENA region (ILO 2015). Moreover, most employed women were working in the agriculture sector, engaged in unpaid work, or were economically inactive because they were fully engaged in household chores (Al-Ammar and Patchett

² Yemen Humanitarian Response Plan 2022 ([April 2022](#)).

2019). A rapid damage needs assessment conducted by the ILO at the start of the war documented the effects of the conflict on women's participation in the economy, reporting job losses estimated at an average of 28 percent among female respondents, compared to 11 percent among male respondents (ILO 2016).

Women have also faced further setbacks throughout the war. A World Bank phone survey asked respondents about coping strategies adopted to ease financial distress (World Bank 2023b). Alarming, 3 percent of respondents said that female children were married to ease financial stress over the last three months alone. This was almost double for displaced households, and higher in Houthi areas than those under IRG control. Child marriage has been a concern in Yemen even before the current conflict started, as 16 percent of women between the ages of 20 and 49 were married before 15 years of age (MOPHP et al. 2015). Notably, in 2013 the median age of marriage was lower among younger women, potentially indicating an improvement in the incidence of child marriage in the future. However, today any of these changes are likely to be reversed, as more households are forced to marry their female children for financial relief amid devastating living conditions.

While many Yemeni households rely on labor income, the importance of remittances to Yemen's economic stability predates the current conflict (Ahmed, Zaid, and Mohsen 2019). For years, the scarcity of viable jobs in Yemen has compelled hundreds of thousands of Yemenis to seek employment abroad. It is likely that Yemeni households' dependence on remittances increased dramatically during the conflict (ACAPS 2021), as they have helped households weather broader socioeconomic shocks, including the sharp depreciation of the local currency, income loss, inflation, and rising unemployment. Remittances have also become the main source of foreign currency and play a more significant role in terms of import financing and Yemen's balance of payments (World Bank 2023a).

With many Yemeni men working abroad,³ women are increasingly stepping in to manage family finances, with wives managing remittance flows more often than male family members. Based on interviews with key informants, an ACAPS report shows that in remittance-dependent households, wives and mothers are generally viewed as more trustworthy and responsible than sons or brothers (ACAPS 2021). Importantly, women encounter obstacles in directly receiving transferred funds, often depending on male guardians, while also facing challenges in accessing necessary identification documents.

III. Literature review and conceptual framework

The paper builds on previous work studying the association between political instability and women empowerment, particularly in Arab States. For instance, Bargain et al (2019) finds a significant improvement in women's final say in decision making in regions most affected by the Arab Spring protests in Egypt. Equally important is the study by Tandon (2018) conducted in Yemen using household welfare data from 2014, comparing household welfare before and after the Houthi take-over of Sana'a. It finds a nearly universal and immediate drop in women's decision-making ability which preceded the worsening of household welfare. This is explained by a worsening of perceptions of safety, resulting in women being less likely to leave the household and make decisions related to spending.

This paper contributes to literature in other conflict affected settings that have explored changes in various indicators of female empowerment. A study from Egypt finds that female labor force participation increased in districts with higher intensity of protests, despite worsening conditions for men (El-Mallakh,

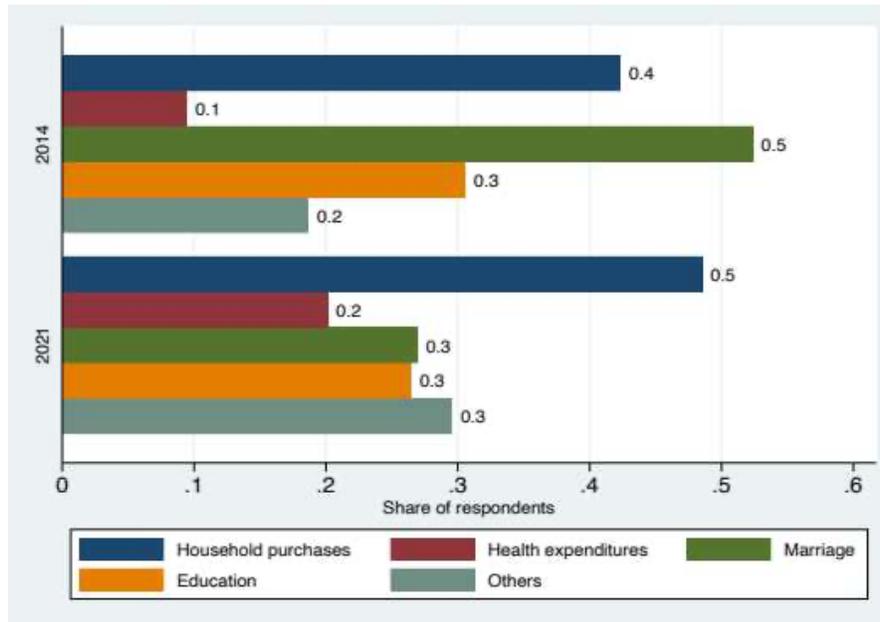
³ According to UN data for 2020, of the 1.3 million Yemeni migrants, about 454,000 were women and 847,000 men.

Maurel, and Speciale 2018). Similarly, evidence from Nepal shows an increase in women's likelihood of employment as a consequence of conflict (Menon and van der Meulen Rodgers 2015), as this becomes an important livelihood option during times of crisis. Qualitative evidence from Gaza and Liberia points to an increase in women's economic agency in towns more affected by conflict, but in Gaza this is combined with men feeling disempowered and limited changes to underlying social norms (Petesch 2018). On the other hand, studying the long term impacts of the 1994 Rwandan genocide, La Mattina (2017) finds an increase in spousal abuse and reduced decision-making power for women, while Schindler (2010) finds that young, unmarried women are more likely to conform to gender roles when there is a shortage of men resulting from the genocide. These conflicting results from different contexts indicate that the impact of violence and conflict on female empowerment is not immediately clear. Much of it will depend on the type of violence experienced, the baseline level of female empowerment, and the economic conditions that are impacted by the conflict. This paper adds more evidence to this debate, while considering some of the channels that could explain these results.

The channels through which conflict and armed violence affect female empowerment could be categorized as direct and indirect (Justino 2018). The direct channels refer to changes in household composition and welfare that require women to take more responsibilities within the household, often joining the labor market to supplement the breadwinner's income or to replace it. In war settings, men are more likely to be killed, join armed groups or move away from the household in search of better livelihood opportunities (as observed in Nepal and Rwanda (Menon and van der Meulen Rodgers 2015; Schindler 2010)). In the absence of the traditional "head of household", women are more likely to have a say in everyday decision making. This is likely to be the main change to household dynamics and gender roles that is relevant for Yemen, which we explore in this paper.

However, the indirect channels refer to societal changes that could take place when the state fails, composition of the community is affected by displacement, local market operations are altered, and the way individuals relate to each other changes. All of these effects are likely to change social norms that govern the role of women (Justino 2018), potentially impacting their empowerment. These more substantial and long-term effects on female empowerment are harder to measure and remain to be observed in the case of Yemen.

Figure 1: Proportion of women participating in decisions in 2014 and 2021



IV. Data and methodology

a. Survey data: HBS 2014 and YHDS 2021

The analysis in this paper draws on two household survey datasets: The Household Budget Survey (HBS) of 2014 and the Yemen Human Development Survey (YHDS) of 2021.

The HBS 2014 is the main welfare survey for Yemen used to construct household consumption and official poverty statistics. It is a multiuse survey, with different modules on welfare, women's role in the household, health, and income. The YHDS 2021 was collected from the areas under the control of the IRG in Yemen. In the first stage of sampling, 105 accessible enumeration areas (EAs) were drawn from the 1,200 EAs of the HBS 2014, providing a panel of EAs over time. The YHDS 2021 then visited a sample of 1,681 households, representative of four regions under IRG control, urban and rural locations, and displacement status. The YHDS provides key indicators on welfare, living conditions, human development outcomes, and women's role in household decision-making.

We construct a combined dataset of 2014 and 2021, limiting the data to the common EAs. This limits the representativity of the analysis, since the YHDS 2021 was not collected across the entire country for security reasons, but it does allow for the analysis of relationships over time. The resulting dataset is 2,469 observations. The pattern of conflict and violence observed in the sample is likely to be different for Yemenis living in the Northern areas and under the control of the Houthis, where we might see different impacts on household decision making and social control. In fact, evidence points to stricter mobility for women in areas under Houthi control (ACAPS 2023), but the nuances of this impact on gender roles are not yet clear. Unfortunately, this remains a limitation of the analysis presented in this paper.⁴

⁴ Figure A1 in the appendix maps the variation in conflict intensity across all districts in Yemen, while highlighting the common 2014-2021 sampled districts in the IRG areas.

The main outcome of interest is women’s participation in household decision making. We consider the involvement of any woman in the household in decisions related to household purchases, health expenditures, marriage of children, education, and other decisions. In Figure 1 we see that women’s involvement in decision making reduced from 2014 to 2021 in terms of the marriage of children, but we see an improvement in 2021 for all other decisions. The average participation across decisions is computed for each household, forming the female decision-making index (FDI). Figure 2 show the variation in this index across districts and over time.⁵

Figure 2a: Female decision-making index in sampled districts in 2014

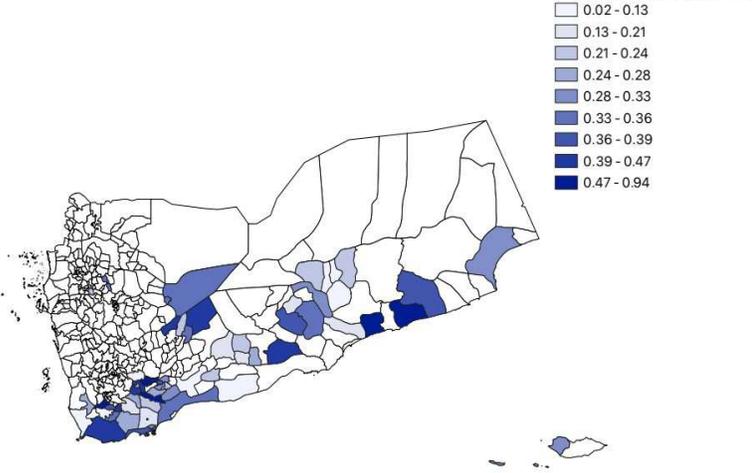
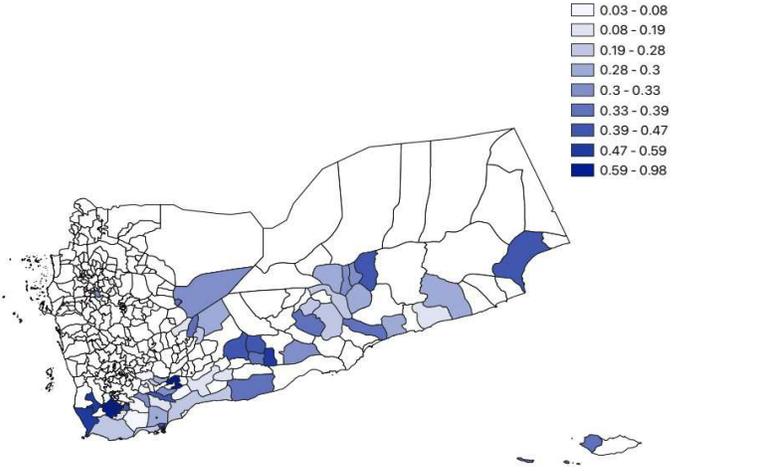


Figure.2b: Female decision-making index in sampled districts in 2021



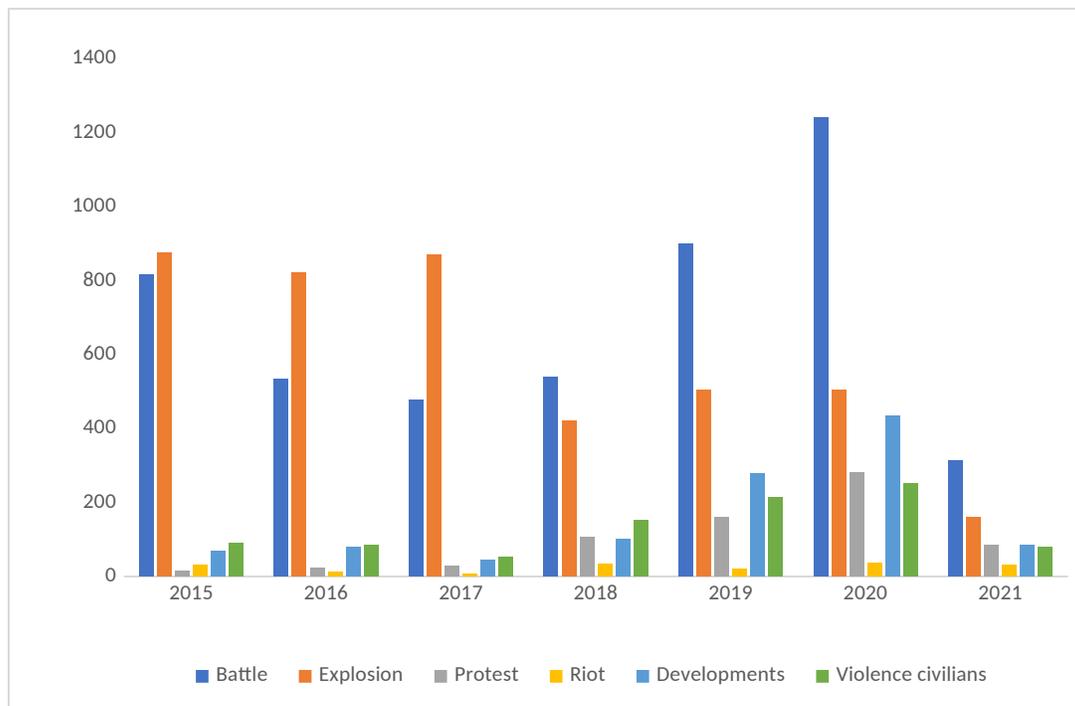
⁵ Figure A2 in the appendix shows the variation in 2014 levels of the female decision-making index across all districts in Yemen.

b. Conflict event data: ACLED

Data on conflict comes from the Armed Conflict and Location Event Database (ACLED) which codes the location and date of a wide range of conflict-related events. We use this geolocated information to assign conflict data to subnational regions at the ADM 2 level (i.e., district). While there have been some violent events before the start of the current conflict, we select the year(s) after the current conflict breakout in 2015, that is the period 2015-2021.⁶ To construct the conflict indicator, we focus on 3 types of events, namely battles, explosions and violence against civilians, summing up the number of occurrences at the district level. The reason for choosing these events lies in the fact that throughout our period of analysis, these events have scored the highest number of occurrences compared to protests, riots, and developments (see Figure 3 and Figure 4). Even though the latter type of event has witnessed a remarkable increase in 2019 and 2020, we exclude it because they often refer to brokered deals or advances that are likely to affect households differently to conflict events. We also choose to focus on the number of events rather than the number of fatalities, since the latter is deemed to suffer from underreporting.⁷ ACLED data is collected from reported conflict events in news outlets, and it is more likely that the number of events are better documented compared to the number of casualties which tends to be less accurate.

After constructing the conflict intensity at the district level, the sample is split into three equal groups of increasing conflict intensity: low, medium, or strong conflict intensity.

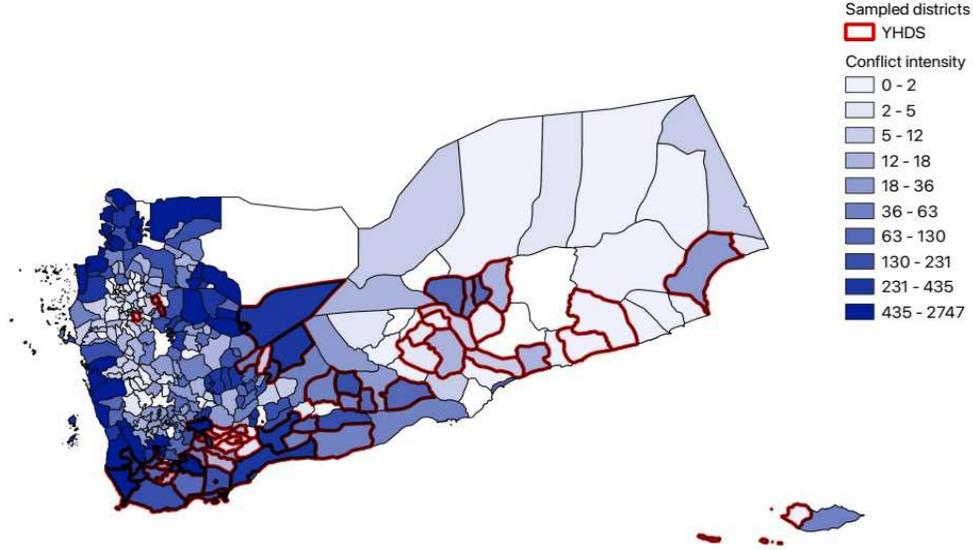
Figure 3: Total number of conflict events by year. Source: ACLED



⁶ ACLED data is not available prior to 2015 to be able to detect trends in the period before the study.

⁷ As a robustness check we control for the number of fatalities and find no difference in the main results reported in the paper.

Figure 4: Conflict intensity and sampled districts



c. Difference-in-difference approach

Our empirical strategy follows a difference-in-difference approach by comparing the female decision-making index in households located in districts with different violence intensities before and after the conflict breakout in 2015. We measure violence in each district by the number of incidents of battles, explosions, and violence against civilians. We define our control group ($D=0$) as all households located in districts with no or few violent events (i.e., low intensity district). Our treatment group ($D=1$) are households living in districts that were highly exposed to violence. To account for different districts having experienced different levels of violence, we allow our treatment variable to have two levels of intensity (i.e., medium, and strong). Following Bargain et al. (2019), our estimation equation takes the following form:

$$Y_{icdt} = \beta Post_t \times Treat_{id} + \gamma Post_t + \delta Treat_{id} + \eta X_i + \theta_c + \varepsilon_i$$

Where Y_{icdt} is the female decision-making index in household i , cluster c , district d , and time period t . $Treat_{id}$ is the treatment variable equal to 1 if the household is located in medium and strong intensity conflict district and 0 for low intensity districts. $Post_t$ is a time dummy equal to 1 for conflict period (year=2021) and 0 for the pre-conflict period (year=2014). X_i is a set of individual and household controls including the woman's age and education, husband's age, and work status (in some specifications), wealth and an urban dummy.

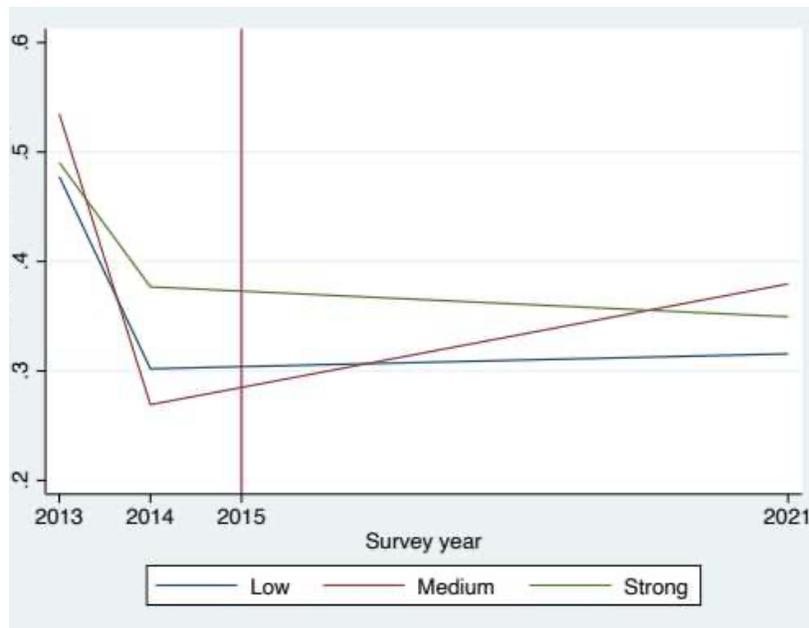
Table A1 in the appendix includes the full list of controls and their summary statistics. θ_c are cluster fixed effects to capture time-invariant characteristics at the cluster level. γ captures the time trends that are common across all districts, and δ captures the average (time-invariant) difference between the control and treated districts. Standard errors are clustered at the district level.

Our main coefficient of interest is β which estimates the effect of living in medium and strong conflict intensity districts on the female decision-making index after the conflict breakout compared to low intensity areas.

We cannot argue that treatment and control groups are randomly assigned, meaning that there are no structural differences between strong and low exposed districts. In fact, conflict and violence is hardly ever exogenous and is usually correlated with baseline socio-economic conditions (Blattman and Miguel 2010). To address this potential bias, the difference-in-difference approach controls for cluster fixed effects which capture the time-invariant pre-existing differences between both groups. Moreover, we augment our specification with the set of covariates in X_{icd} which controls for specific individual and household characteristics.

However, for a valid difference-in-difference estimation, the common trend assumption must be satisfied. This requires that the level of female participation in decision making in the treatment and control groups should follow the same trend in the absence of the conflict event, and that the deviation that occurs in the treatment group is only due to conflict breakout. This implies checking the underlying trend in intrahousehold female decision-making for both groups in at least one point in time prior to 2014. Unfortunately, we do not have household survey data prior to 2014 to test this assumption, therefore we resort to the Yemen Demographic and Household survey (DHS) in 2013 to test this assumption. We focus on similar module from the *women in the household module*, particularly on decisions related to household purchases and health. Because the DHS data is only available at the governorate level, we aggregate all our indicators to this level. Figure 5 provides visual evidence of an underlying common trend in the treatment (medium and strong intensity) and control (low intensity) groups, and a deviation in the trend induced by the treatment effect following the conflict breakout in 2015.

Figure 5: Parallel trends of women’s role in decisions related to health and household purchases only



V. Results

a. Main results

To get a first snapshot of the differential effect of exposure to conflict on the female decision-making index (FDI), Figure 6 plots the average FDI index in 2014 and 2021 for different degrees of conflict intensity. The dashed line represents the average FDI for all districts irrespective of the conflict intensity and it shows a slight increase between the two periods. Differentiating by conflict intensity, we find that this increase is largely driven by districts that witnessed medium levels of conflict intensity. These medium conflict intensity districts record an average increase from 0.28 to 0.39 from 2014 to 2021 (see Table A2: in the appendix). Looking at FDI sub-indices in Table A2:, we notice that the difference between medium and low conflict-exposed districts is driven by significant improvements in women’s participation in decisions regarding household purchases and education for her children. The same holds for medium and strong conflict-exposed districts, but in addition we also observe significant improvements in women’s participation in decisions regarding health expenditures.

Figure 6: Change of FDI over time and across conflict intensity levels

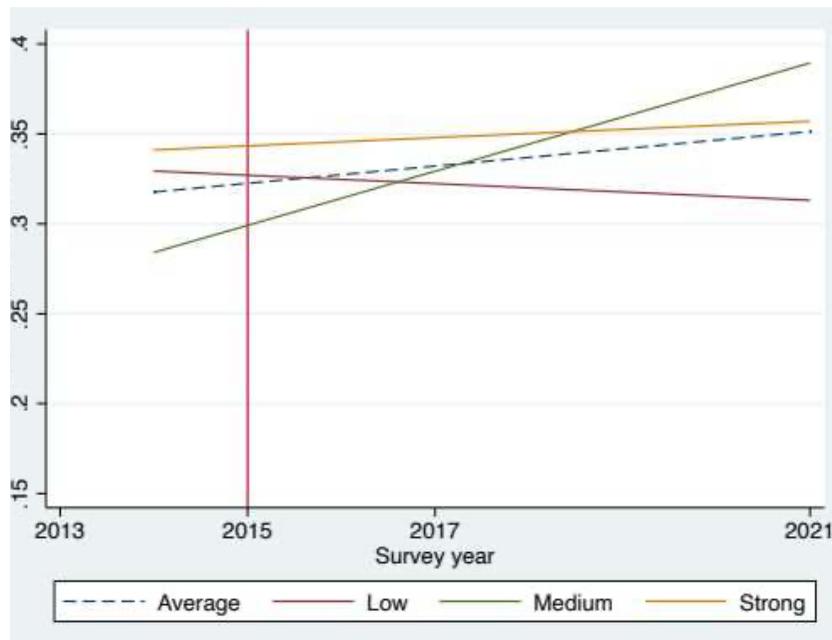


Table 1 presents our main regression results, which control for individual, household and PSU effects. Columns 1 and 2 include all sampled households (i.e., single female headed and couples with their household members), while column 3 examines only couples with their household members. In column 1, we include primary sample units fixed effects and year fixed effects. In column 2, we add women’s controls in terms of age, education, marital and employment status, and household real per capita consumption. We also include dummies for urban and polygamous households. Finally, in column 3, we restrict our sample to couples and include controls for husband’s age, education, and employment status. Throughout all the columns, we find a positive effect of medium exposure to conflict on the female decision-making index compared to the low exposed group, with the effects becoming stronger in magnitude and significance when controlling for women’s characteristics. The estimated coefficients yield

a change of about 0.14 - 0.17 points. This translates to a relative increase in the female decision-making index of 50 to 61 percent in medium conflict districts compared to low conflict districts. Interestingly, there is no significant effect of living in a strong conflict intensity district, although the coefficient is positive across the three specifications.

Table 1: Main regression results

| | (1) | (2) | (3) |
|------------------|------------------|--------------------|-------------------|
| | FDI | FDI | FDI |
| Medium x 2021 | 0.137 (0.082) | 0.173** (0.082) | 0.116* (0.061) |
| Strong x 2021 | 0.043 (0.059) | 0.055 (0.062) | 0.052 (0.053) |
| PSU dummies | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes |
| Women controls | No | Yes | Yes |
| Partner controls | No | No | Yes |
| Observations | 2,366 | 2,315 | 2,025 |
| R-squared | 0.120 | 0.146 | 0.161 |

The dependent variable is the female decision-making index (FDI). Standard errors clustered at the district level

In Table 2 and Table 3, we unpack the FDI index into its sub-indices: Table 2 includes all women in the sample, while Table 3 is restricted to couples. Results show that the observed change in the FDI index is driven by significant improvements in women's participation in household decision making related to household purchases and children's education in medium conflict districts. The estimated coefficients indicate a 0.25 - 0.29-point increase in household purchases decisions compared to 0.19 - 0.24-point increase in children education decisions. There is no significant change with regard to participation in decisions regarding medical purchases, children's marriage, or other decisions.

Table 2: Results for sub-indices – All sample

| | (1) | (2) | (3) | (4) | (5) |
|------------------|------------------------------|-------------------|-------------------|--------------------|-------------------|
| | Purchases of food & clothing | Medical purchases | Children marriage | Children education | Others |
| Medium x 2021 | 0.293** (0.119) | 0.049 (0.077) | -0.026 (0.111) | 0.242** (0.100) | 0.072 (0.098) |
| Strong x 2021 | 0.135 (0.095) | -0.083 (0.064) | 0.026 (0.114) | 0.003 (0.093) | -0.051 (0.116) |
| PSU dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes |
| Women controls | Yes | Yes | Yes | Yes | Yes |
| Partner controls | No | No | No | No | No |
| Observations | 2,311 | 2,240 | 1,402 | 1,794 | 2,160 |
| R-squared | 0.180 | 0.182 | 0.192 | 0.173 | 0.130 |

The dependent variables are the sub-indices of the female decision-making index (FDI). Standard errors clustered at the district level.

Table 3: Results for sub-indices – couples' sample

| | (1) | (2) | (3) | (4) | (5) |
|------------------|------------------------------|-------------------|-------------------|--------------------|-------------------|
| | Purchases of food & clothing | Medical purchases | Children marriage | Children education | Others |
| Medium x 2021 | 0.251** (0.103) | -0.002 (0.055) | -0.041 (0.115) | 0.186* (0.097) | 0.016 (0.100) |
| Strong x 2021 | 0.138 (0.091) | -0.096 (0.061) | 0.083 (0.114) | -0.015 (0.101) | -0.037 (0.117) |
| PSU dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes |
| Women controls | Yes | Yes | Yes | Yes | Yes |
| Partner controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,024 | 1,990 | 1,233 | 1,583 | 1,894 |
| R-squared | 0.221 | 0.149 | 0.283 | 0.196 | 0.136 |

The dependent variables are the sub-indices of the female decision-making index (FDI). Standard errors clustered at the district level.

b. Sensitivity checks

Our baseline results have established that the female decision-making index has significantly improved in medium conflict districts relative to low conflict districts. To check the sensitivity of the results, we proceed with a series of robustness checks based on column 2 (i.e., full sample) of the main results in Table 1.⁸ We repeat the analysis reported in the main results while controlling for the intensity of conflict, controlling for children living in the household, excluding polygamous households, excluding women that were not privately interviewed, considering alternate measures of conflict intensity, excluding districts that saw extreme levels of conflict intensity, and excluding a district from the sample one-by-one. These checks, summarized in Table 4, prove that the results reported in this paper are satisfactorily robust in the face of alternate specifications and conditions.

Table 4: Sensitivity checks

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|--------------------------------------|--------------------|-------------------------------|----------------------------|-----------------------|---|---------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | FDI | FDI | FDI | FDI | FDI | FDI | FDI | FDI | FDI |
| | Baseline | Weigh by number of fatalities | Control for children in HH | Exclude polygamous HH | Exclude women not privately interviewed | Sum of events (2017-2019) | Average number of events (2015-2021) | Drop extreme conflict districts (1%) | Drop extreme conflict districts (5%) |
| Medium x 2021 | 0.173** (0.082) | 0.233** (0.093) | 0.179** (0.079) | 0.186** (0.085) | 0.325 (0.303) | 0.161* (0.084) | 0.173** (0.082) | 0.173** (0.085) | 0.160* (0.087) |
| Strong x 2021 | 0.055 (0.062) | 0.067 (0.086) | 0.074 (0.065) | 0.065 (0.064) | -0.002 (0.096) | 0.060 (0.064) | 0.055 (0.062) | 0.060 (0.062) | 0.046 (0.063) |
| Medium x 2021 x number of fatalities | | 0.0001 (0.002) | | | | | | | |
| Strong x 2021 x number of | | 0.001 | | | | | | | |

⁸ We find a similar level of robustness when considering the couples sample (i.e., in comparison to column 3 of Table 1), but these are not reported for the sake of brevity and are available upon request from the authors.

| fatalities | | | | | | | | | |
|------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| | (0.002) | | | | | | | | |
| PSU dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Women controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Partner controls | No | No | No | No | No | No | No | No | No |
| Observations | 2,315 | 2,315 | 1,678 | 2,258 | 411 | 2,315 | 2,315 | 2,290 | 2,222 |
| R-squared | 0.146 | 0.147 | 0.187 | 0.145 | 0.435 | 0.145 | 0.146 | 0.142 | 0.137 |

Intensity of violence. Our measure for conflict classifies the intensity of conflict into low, medium, and strong intensity districts in terms of number of events. It follows that this measure does not indicate the degree of violence associated with these events. To account for that, we include the number of fatalities as an additional control, both on its own and interacted with the difference-in-difference estimators. Results are presented in Table 4, and as shown in column 2, the effect of medium exposure to conflict on FDI remains positive and statistically significant, while strong exposure to conflict leads to no change in FDI compared to low exposure districts. The interaction term with the number of fatalities is positive, but it is not statistically significant. This means that all medium conflict districts have witnessed an increase in FDI compared to low conflict districts regardless of the number of fatalities that have occurred.

Additional controls. Our main specification is rich with district and individual controls. Nevertheless, there could be other factors affecting the results that have been excluded.

Firstly, we include the number of children living in the households, which could affect women's ability to participate in decision making, especially if these decisions are related to their needs. This data was not complete when collected in 2014 and thus excluded from the main specification. However, when controlling for this in column 3 we see the results do not change.

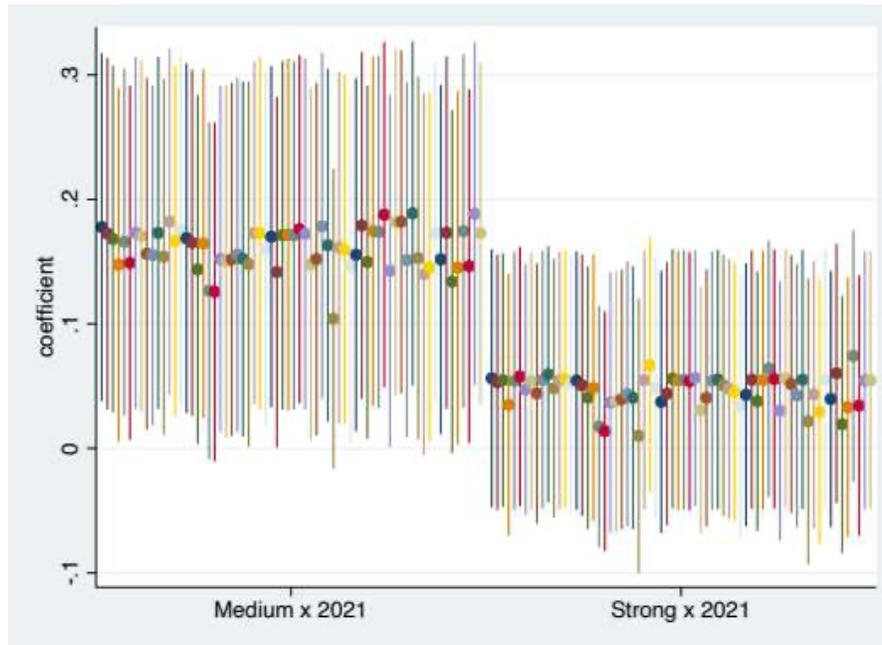
Another factor is whether the household head is polygamous or not. Having multiple wives can be associated with a limited ability of a given wife to decide on related household matters. However, polygamous households represent a tiny fraction of the sample (2.5%), and are unlikely to be driving results. Nevertheless, in column 4, we exclude polygamous households and find that the estimated coefficient for medium conflict districts has actually slightly increased. This implies that the main result is not driven by polygamous households.

Finally, we focus on interview conditions and test whether the presence of the woman's husband or other men during the interview might have affected the women's responses. In column 5, we limit the analysis to a small sub-sample of women who have been interviewed privately. We still find that women in medium conflict district have a higher participation in decision-making, but the effect is not statistically significant. However, this is likely due to the smaller sample size of 411 women who were privately interviewed.

Measures of conflict. For the main specification, the measure for conflict intensity is constructed by summing up the number of violent events over the period 2015-2021 at the district level. To check the sensitivity of the results to time variation in conflict occurrences, we recalculate our conflict measure in two ways. Firstly, we sum up events that have occurred over the middle period of 2017-2019. Secondly, we consider the average number of events for the whole period. Table 4 contains the results of including the shorter time-period and average conflict in columns 2 and 3 respectively. We see that the main results still hold with very little change in the estimated coefficients. We also drop the top 1% and 5% of extreme conflict districts in the sample in columns 6 and 7 respectively, showing that the results remain robust.

District composition. Finally, we check the sensitivity of the estimates to the included districts by excluding one district at time and re-estimating our regression in case the results are driven by a single district. Figure 7: plots the estimated coefficients for the difference-in-difference estimators in medium and strong conflict areas, and in more than 97% of the cases, the estimates remain robust in sign and statistical significance.

Figure 7: Difference-in-difference coefficient when dropping a district one-by-one



c. Mechanisms and interpretation

After establishing the robustness of the main result of an increase in the female decision-making index in medium conflict intensity districts, this section explores the mechanisms behind this result. We consider some potential direct and indirect mechanisms by controlling for different factors and exploring different parts of the data. These results are summarized in and .

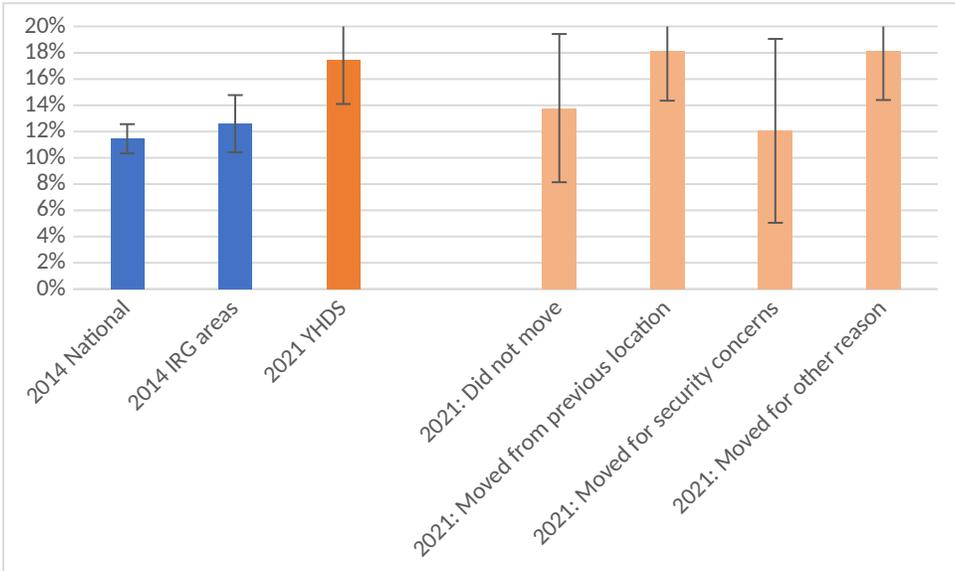
Direct channels

Much of the literature that studies the impact of conflict on women has focused on how violent shocks increase female labor force participation (El-Mallakh, Maurel, and Speciale 2018; Menon and van der Meulen Rodgers 2015), especially as researchers aimed to test the World War II “effect” in other countries (Acemoglu, Autor, and Lyle 2004). However, when comparing the raw difference-in-difference of female employment outcomes in , we see that female employment has decreased. Further, when controlling for other characteristics we find no significant effect of conflict on employment in column 1 of . In column 2, we control for the difference in male and female employment statuses and find that the impact of medium intensity is slightly more significant than in the main specification.

Conflict can also change the composition of households, whereby male members are more likely to have left the household, either because they have been killed in battle, are currently fighting, or perhaps more likely have migrated in search of economic opportunities in a more stable situation (see for example, a study of the disproportionate killing of men in the Rwandan genocide and the impact on female headed households (Brück and Schindler 2009)). According to the data, the prevalence of female headed households in IRG areas has increased from 13 percent to 17 percent (Figure 8:). This higher prevalence is

largely driven by households who have moved since the start of the conflict, albeit for non-conflict related reasons.

Figure 8: Prevalence of female headed households



To investigate whether changes in household composition could be driving the results, we control for whether the household is headed by a female in column 3 of Table 5 and in column 4 we additionally interact this variable with the difference-in-difference effect. In column 3, the indicator for female headed households is positive and statistically significant, with the main result staying the same. In column 4, the estimated coefficient of medium conflict districts drops in magnitude from 0.17 to 0.11 while remaining significant. When combining this effect with the marginal impact of female headed households in medium conflict affected districts, there is a 0.72 point increase in FDI. This channel partially explains the results. As further evidence, we also control for whether the household receives remittances, as well as the proportion of men to women in the household in columns 5 and 6 respectively. This could give an indication of how reliant the household is on someone outside the household (potentially the absent male members). We see that the main effect loses significance, indicating a convincing mechanism explaining the change in FDI.

Indirect channels

The conflict in Yemen has led to high levels of displacement and movements in the population as people and households escape violence and seek better conditions. Calderón, Gáfaró, and Ibáñez (2011) find that women from displaced households in Colombia are more likely to participate in the labor force because their skill sets are more transferable than those of men. Evidence in other contexts points to a similar phenomenon as women are more likely to work in the informal sector while male IDPs are excluded. As conflict exposure is likely to be correlated with displacement, in column 7 we control for whether the household has been displaced and find that the main effect of medium intensity conflict on FDI is slightly smaller, but that women living in strong intensity conflict districts also see a significant increase in the female decision-making index. This result could be explained by some of the changes to household composition described earlier, and deserves further research to be fully understood.

Table 5: Mechanisms: Additional controls and interactions

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|-----------------------------|--------------------------|------------------------------------|---|---|----------------------------|--|--------------------------|
| | Female employmen t | FDI Work difference s | FDI Female headed household s | FDI Female headed household s | FDI Remittance s | FDI Proportio n of men to women | FDI IDP status |
| Medium x 2021 | -0.088 (0.074) | 0.189** (0.088) | 0.173** (0.079) | 0.110* (0.061) | -0.012 (0.088) | -0.049 (0.082) | 0.135** * (0.046) |
| Strong x 2021 | 0.041 (0.057) | 0.025 (0.079) | 0.062 (0.061) | 0.050 (0.055) | 0.070 (0.076) | -0.127 (0.076) | 0.312** * (0.043) |
| Indicator for female head | | | 0.274*** (0.084) | 0.538 (0.335) | | | |
| Medium x 2021 x female head | | | | 0.611 (0.393) | | | |
| Strong x 2021 x female head | | | | 0.285 (0.382) | | | |
| PSU dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Women controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Partner controls | No | Yes | No | No | No | No | No |
| Observations | 2,315 | 2,033 | 2,315 | 2,315 | 2,315 | 2,315 | 2,315 |
| R-squared | 0.216 | 0.244 | 0.162 | 0.174 | 0.154 | 0.136 | 0.335 |

Standard errors clustered at the district level.

Finally, we explore whether perceptions of safety and mobility could be associated with conflict. While this information was not collected in 2014, in we report the results of a cross-sectional regression analysis that considers a safety index (higher values indicate not feeling safe) and a mobility index (higher values indicate more mobility). There is a clear and significant pattern – women living in districts with medium intensity conflict report feeling more safe and more mobile compared to low intensity districts. However, this result is reversed for women living in strong intensity districts, who report feeling less safe and less mobile during the day (but not at night). These results indicate that there could be changes to the community and neighborhood due to conflict that could be indirectly associated with women’s role in decision-making. It could also explain why the female decision-making index is not significantly affected in strong intensity districts, since safety and mobility are diminished.

Table 6: Mechanisms: Cross-sectional analysis from YHDS 2021

| | (1) | (2) | (3) | (4) |
|------------------|---------------------|----------------------|----------------------------|--------------------------|
| | Safety | | Mobility | |
| | At day | At night | Going out to market at day | Going out to work at day |
| Medium | -0.057** (0.024) | -1.090*** (0.035) | 0.794*** (0.017) | 0.343*** (0.023) |
| Strong | 0.718*** (0.015) | 0.513*** (0.031) | -0.071*** (0.013) | 0.036** (0.017) |
| PSU dummies | Yes | Yes | Yes | Yes |
| Women controls | Yes | Yes | Yes | Yes |
| Partner controls | No | No | No | No |
| Observations | 1,561 | 1,561 | 1,553 | 1,460 |
| R-squared | 0.258 | 0.380 | 0.456 | 0.308 |

Standard errors clustered at the district level.

These results indicate that the main channel for an increase in women’s participation in decision making, particularly in areas that have experienced conflict at a “medium intensity level”, is driven by significant changes to household composition. Potentially due to domestic or international migration of men, as well as the deaths of many men in the battlefields, more households are headed by women than before the war started. While we see better involvement of women in decision making, it should be noted that many of these households remain more vulnerable. Aggregate household consumption per capita, which is measured using the YHDS, is lower among female headed households. The bottom 20 percent and 40 percent of households by consumption per capita are more likely to be female headed households (World Bank, forthcoming). Other studies in the region have also seen this pattern, and it cannot be explained by differentials in endowments alone (Alazzawi 2018).

VI. Conclusion

This paper contributes crucial evidence to an ongoing debate on the effect of violence on gender roles, particularly in the context of the ongoing conflict in South Yemen. By employing a difference-in-difference approach, the results show that women living in districts with medium conflict intensity have a higher female decision-making index compared to those living in low conflict intensity districts. This effect is also positive for those living in strong conflict intensity districts but is not significant. The results are held when employing a battery of robustness tests.

We also present evidence of how the composition of households could explain these results. Men are likely to feel the direct effects of conflict, by fighting, getting kidnapped or arrested, or leaving the household in search of better economic opportunities. In these cases, women are left in control of the household and are required to make everyday decisions related to purchases and the children (although notably not their children’s marriage). Interestingly, women are not more likely to be working, and are able to achieve this agency without economic empowerment per se.

Qualitative data has shown that some widows have taken over businesses once owned by their deceased husbands, while women in some regions have entered professions that had customarily been

closed to them, such as food service and retail. Despite the conflict negatively impacting most female business owners, it is also reported as one of the main reasons for starting an enterprise.

However, these results should also take into account that household well-being, measured through consumption per capita, is worse for female headed households. This is consistent with findings in other countries. So, while we observe increased decision-making agency, this might not reflect the full picture of increasing vulnerability for women in Yemen.

Moreover, if the change in the composition of households is only temporary over the course of the war, we might see a reversion to the old social norms and habits once the conflict in Yemen ends. Instead, policy makers could capitalize on this opportunity to further empower women beyond the confines of the household. Women could be further involved in economic opportunities or participate in decisions related to the wider community and public life. As seen in other contexts, repeated exposure to public life, other female role models, and sustainable livelihood opportunities could lead to long-term changes.

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Appendix – Additional tables and figures

Figure A1: Conflict intensity index across all districts

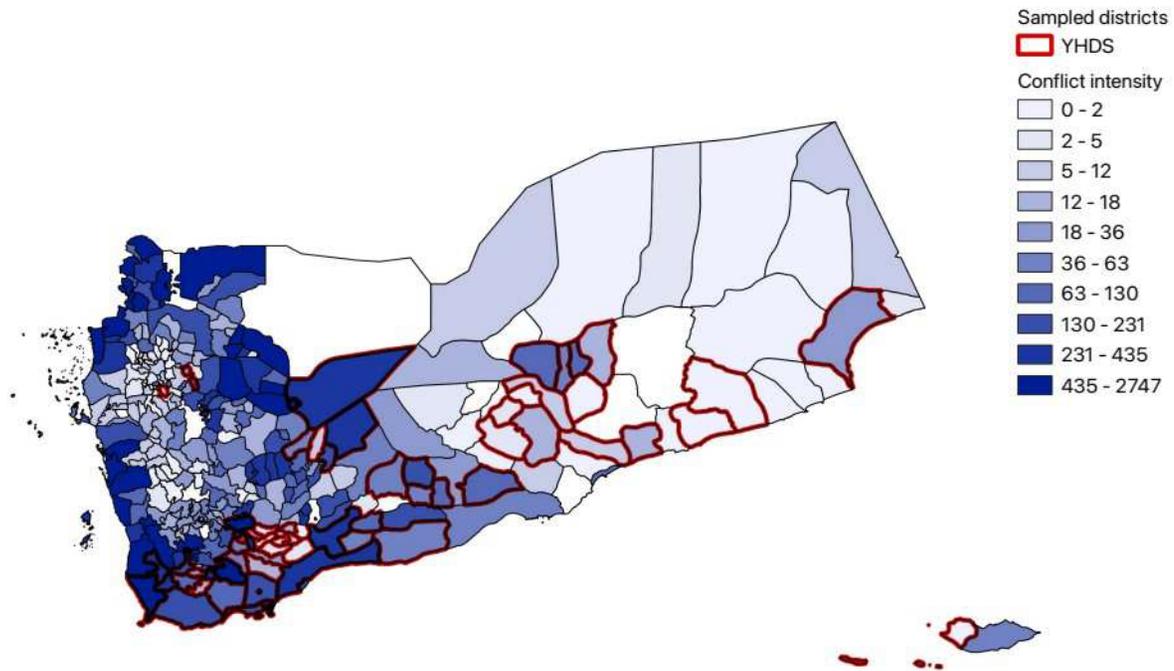


Figure A2: Female decision-making index across all HBS 2014 districts

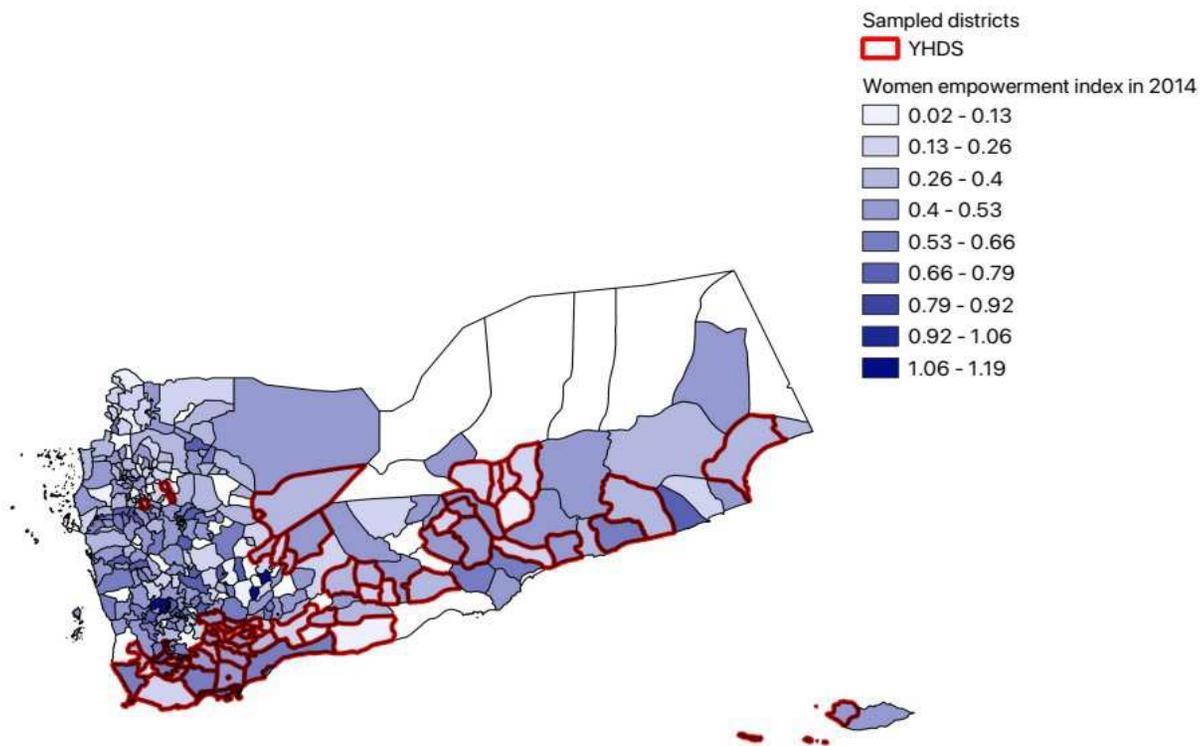


Table A1: Summary statistics of outcome variables and controls

| | 2014 | | | | | 2021 | | | | | |
|-------------------------------------|------|-------|-------|-----|-----|-------------------------------------|------|-------|-------|-----|----|
| | N | Mean | SD | Min | Max | N | Mean | SD | Min | Max | |
| Female decision-making index | 840 | 0.32 | 0.32 | 0 | 2 | Female decision-making index | 1706 | 0.35 | 0.46 | 0 | 2 |
| Woman's age | 803 | 40.77 | 12.92 | 18 | 82 | Woman's age | 1653 | 37.93 | 12.86 | 13 | 90 |
| Woman employed | 802 | 0.21 | 0.41 | 0 | 1 | Woman employed | 1653 | 0.12 | 0.33 | 0 | 1 |
| Woman's marital status | | | | | | Woman's marital status | | | | | |
| Married | 803 | 0.95 | 0.22 | 0 | 1 | Married | 1653 | 0.92 | 0.27 | 0 | 1 |
| Never married | 803 | 0.00 | 0.04 | 0 | 1 | Never married | 1653 | 0.01 | 0.08 | 0 | 1 |
| Divorced | 803 | 0.00 | 0.05 | 0 | 1 | Divorced | 1653 | 0.01 | 0.11 | 0 | 1 |
| Widowed | 803 | 0.05 | 0.21 | 0 | 1 | Widowed | 1653 | 0.06 | 0.24 | 0 | 1 |
| Woman's Education grade | | | | | | Woman's Education grade | | | | | |
| No school | 803 | 0.59 | 0.49 | 0 | 1 | No school | 1648 | 0.48 | 0.50 | 0 | 1 |
| Basic education | 803 | 0.30 | 0.46 | 0 | 1 | Basic education | 1648 | 0.32 | 0.47 | 0 | 1 |
| Pre-secondary diploma | 803 | 0.00 | 0.05 | 0 | 1 | Pre-secondary diploma | 1648 | 0.00 | 0.02 | 0 | 1 |
| Secondary education | 803 | 0.08 | 0.27 | 0 | 1 | Secondary education | 1648 | 0.14 | 0.35 | 0 | 1 |
| Post-secondary education | 803 | 0.03 | 0.18 | 0 | 1 | Post-secondary education | 1648 | 0.06 | 0.25 | 0 | 1 |
| Others | 803 | 0.00 | 0.00 | 0 | 0 | Others | 1648 | 0.00 | 0.02 | 0 | 1 |
| Location | | | | | | Location | | | | | |
| Urban | 847 | 0.46 | 0.50 | 0 | 1 | Urban | 1719 | 0.47 | 0.50 | 0 | 1 |
| Rural | 847 | 0.54 | 0.50 | 0 | 1 | Rural | 1719 | 0.53 | 0.50 | 0 | 1 |
| Total no. of children alive in HH | 573 | 3.97 | 2.41 | 0 | 12 | Total no. of children alive in HH | 1206 | 1.95 | 2.31 | 0 | 12 |
| Per capita consumption (deciles) | 847 | 6.14 | 2.75 | 1 | 10 | Per capita consumption (deciles) | 1695 | 6.03 | 2.92 | 1 | 10 |
| Polygamous households | 847 | 0.04 | 0.18 | 0 | 1 | Polygamous households | 1719 | 0.02 | 0.13 | 0 | 1 |
| Husband's age | 783 | 46.13 | 14.50 | 17 | 89 | Husband's age | 1498 | 44.03 | 14.18 | 14 | 97 |
| Husband employed | 781 | 0.79 | 0.41 | 0 | 1 | Husband employed | 1498 | 0.48 | 0.50 | 0 | 1 |
| Husband's Education grade | | | | | | Husband's Education grade | | | | | |
| No school | 826 | 0.30 | 0.46 | 0 | 1 | No school | 1623 | 0.20 | 0.40 | 0 | 1 |

| | | | | | | | | | | | |
|--------------------------|-----|--------|--------|---|---|--------------------------|------|--------|--------|---|---|
| Basic education | 826 | 0.32 | 0.47 | 0 | 1 | Basic education | 1623 | 0.36 | 0.48 | 0 | 1 |
| Pre-secondary diploma | 826 | 0.01 | 0.11 | 0 | 1 | Pre-secondary diploma | 1623 | 0.01 | 0.10 | 0 | 1 |
| Secondary education | 826 | 0.19 | 0.39 | 0 | 1 | Secondary education | 1623 | 0.24 | 0.43 | 0 | 1 |
| Post-secondary education | 826 | 0.16 | 0.37 | 0 | 1 | Post-secondary education | 1623 | 0.18 | 0.39 | 0 | 1 |
| Others | 826 | 0.0109 | 0.1039 | 0 | 1 | Others | 1623 | 0.0031 | 0.0554 | 0 | 1 |

Table A2: Changes in outcome indicators over time and conflict intensity

| | Weak | | Medium | | Strong | | Absolute diff-in-diff | | | Significance | | | Relative diff-in-diff | | |
|---|-------|-------|--------|-------|--------|-------|-----------------------|-------|-------|--------------|-----|-----|-----------------------|-------|-------|
| | 2014 | 2021 | 2014 | 2021 | 2014 | 2021 | M-W | S-W | S-M | M-W | S-W | S-M | M-W | S-W | S-M |
| Female decision-making index (composite) | 0.33 | 0.31 | 0.28 | 0.39 | 0.34 | 0.36 | 0.13 | 0.04 | -0.09 | *** | | ** | 0.39 | 0.12 | -0.32 |
| FDI sub-indices | | | | | | | | | | | | | | | |
| Decide on household purchases | 0.43 | 0.37 | 0.39 | 0.56 | 0.45 | 0.52 | 0.23 | 0.13 | -0.1 | *** | ** | * | 0.53 | 0.30 | -0.26 |
| Decide on health expenditures | 0.09 | 0.22 | 0.08 | 0.24 | 0.12 | 0.16 | 0.03 | -0.09 | -0.12 | | * | ** | 0.33 | -1.00 | -1.50 |
| Decide on marriage of her children | 0.50 | 0.26 | 0.59 | 0.30 | 0.49 | 0.27 | -0.05 | 0.02 | 0.07 | | | | -0.10 | 0.04 | 0.12 |
| Decide on education of her children | 0.31 | 0.22 | 0.20 | 0.31 | 0.40 | 0.28 | 0.2 | -0.03 | -0.23 | *** | | *** | 0.65 | -0.10 | -1.15 |
| Other decisions (care of elderly & debt) | 0.23 | 0.36 | 0.13 | 0.29 | 0.18 | 0.25 | 0.03 | -0.06 | -0.09 | | | * | 0.13 | -0.26 | -0.69 |
| Controls | | | | | | | | | | | | | | | |
| Woman's age | 41.38 | 39.64 | 40.63 | 38.16 | 39.86 | 36.16 | -0.73 | -1.96 | -1.23 | | | | -0.02 | -0.05 | -0.03 |
| Woman employed | 0.19 | 0.13 | 0.30 | 0.14 | 0.15 | 0.10 | -0.1 | 0.01 | 0.11 | *** | | *** | -0.53 | 0.05 | 0.37 |
| Woman's marital status | | | | | | | | | | | | | | | |
| Married | 0.97 | 0.93 | 0.95 | 0.90 | 0.94 | 0.92 | -0.01 | 0.02 | 0.03 | | | | -0.01 | 0.02 | 0.03 |
| Never married | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | | | | 0.00 | 0.00 | 0.00 |
| Divorced | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.01 | 0.01 | 0.00 | -0.01 | | | | 0.00 | 0.00 | 0.00 |
| Widowed | 0.03 | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | -0.02 | -0.03 | -0.01 | | | | -0.67 | -1.00 | -0.20 |
| Woman's Education grade | | | | | | | | | | | | | | | |
| No school | 0.53 | 0.51 | 0.63 | 0.49 | 0.59 | 0.43 | -0.12 | -0.15 | -0.03 | ** | | | -0.22 | -0.28 | -0.04 |
| Basic education | 0.41 | 0.36 | 0.25 | 0.31 | 0.23 | 0.28 | 0.11 | 0.11 | 0.00 | *** | *** | | 0.27 | 0.26 | -0.01 |
| Pre-secondary diploma | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | 0.00 | | | | 0.00 | 0.00 | -0.04 |
| Secondary education | 0.05 | 0.09 | 0.07 | 0.15 | 0.13 | 0.18 | 0.03 | 0.01 | -0.02 | | *** | * | 0.67 | 0.14 | -0.34 |
| Post-secondary education | 0.01 | 0.03 | 0.04 | 0.05 | 0.05 | 0.11 | -0.02 | 0.04 | 0.06 | | ** | | -1.51 | 3.39 | 1.36 |
| Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | | | | 0.00 | 0.00 | 0.00 |
| Location | | | | | | | | | | | | | | | |
| Urban | 0.32 | 0.37 | 0.39 | 0.39 | 0.67 | 0.68 | -0.05 | -0.04 | 0.01 | | | | -0.16 | -0.13 | 0.03 |
| Rural | 0.68 | 0.63 | 0.61 | 0.61 | 0.33 | 0.32 | 0.05 | 0.04 | -0.01 | | | | 0.07 | 0.06 | -0.02 |

| | | | | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-----|-------|-------|-------|
| Total no. of children alive in HH | 3.67 | 1.92 | 3.91 | 2.04 | 4.24 | 1.77 | -0.12 | -0.72 | -0.6 | | ** | ** | -0.03 | -0.20 | -0.15 |
| Per capita consumption (deciles) | 5.05 | 6.05 | 6.41 | 6.01 | 7.17 | 5.85 | -1.4 | -2.32 | -0.92 | *** | *** | *** | -0.28 | -0.46 | -0.14 |
| Polygamous households | 0.03 | 0.02 | 0.04 | 0.02 | 0.04 | 0.01 | -0.01 | -0.02 | -0.01 | | | | -0.33 | -0.67 | -0.25 |
| Husband's age | 47.13 | 47.19 | 45.41 | 43.84 | 45.22 | 41.16 | -1.63 | -4.12 | -2.49 | | *** | | -0.03 | -0.09 | -0.05 |
| Husband employed | 0.76 | 0.38 | 0.83 | 0.54 | 0.79 | 0.51 | 0.09 | 0.1 | 0.01 | | * | | 0.12 | 0.13 | 0.01 |
| <i>Husband's Education grade</i> | | | | | | | | | | | | | | | |
| No school | 0.31 | 0.22 | 0.29 | 0.21 | 0.29 | 0.18 | 0.02 | -0.01 | -0.03 | | | | 0.05 | -0.05 | -0.11 |
| Basic education | 0.33 | 0.38 | 0.31 | 0.37 | 0.32 | 0.33 | 0.01 | -0.03 | -0.04 | | | | 0.03 | -0.10 | -0.13 |
| Pre-secondary diploma | 0.01 | 0.01 | 0.02 | 0.01 | 0.01 | 0.01 | -0.01 | 0.01 | 0.02 | | | | -0.65 | 0.38 | 0.81 |
| Secondary education | 0.19 | 0.24 | 0.21 | 0.24 | 0.19 | 0.24 | -0.02 | 0.00 | 0.02 | | | | -0.10 | -0.02 | 0.07 |
| Post-secondary education | 0.16 | 0.15 | 0.14 | 0.16 | 0.20 | 0.24 | 0.03 | 0.05 | 0.02 | | | * | 0.20 | 0.29 | 0.11 |
| Others | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | -0.03 | 0.00 | 0.03 | *** | | *** | 0.00 | 0.00 | 0.88 |