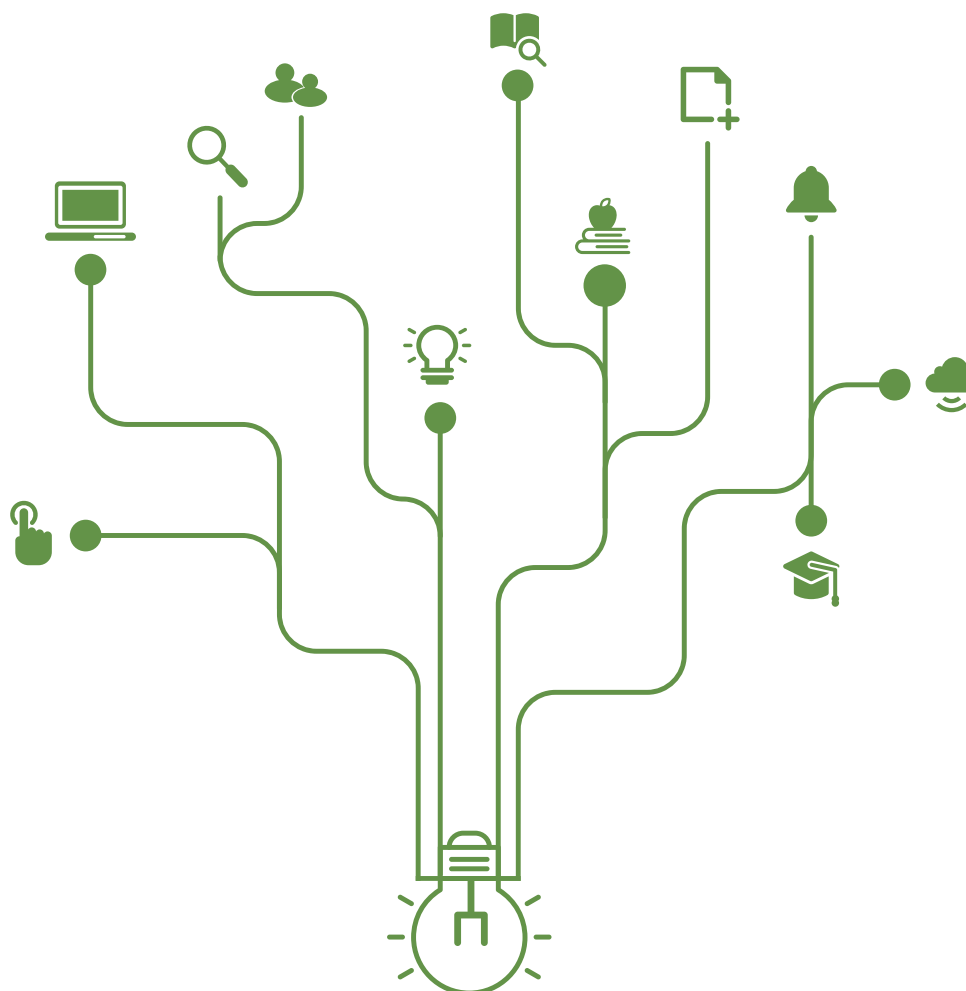# The Arab Spring, A Setback for Gender Equality? Evidence from the Gallup World Poll

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The Arab Spring, A Setback for Gender Equality? Evidence from the Gallup World Poll

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Abstract

Combining a unique dataset from the Gallup World Poll for the period 2009 to 2018 with Wolfsfeld et al.'s (2013) protest index, we evaluate the impact of the Arab Spring pro-democracy protests on gender equality in the Middle East and North Africa. Following a double- and triple-difference approach, we find that protests significantly reduced female labor force participation as well as support for women's rights. In particular, a one-standard-deviation increase in the protest intensity lowered female participation rates by 3.7 percentage points. Likewise, Arab Spring protests significantly lowered support for women's legal rights, occupational rights, and divorce rights. Our results are robust to different samples, alternative model specifications, and omitted variable bias. They are also confirmed when using an alternative protest measure from Steinert-Threlkeld (2017). Regarding potential mechanisms, we suggest that a shift in the Arab *zeitgeist* towards a less secular society can help explain our findings.

Keywords: Arab Spring; Protests; Gender norms; Female labor force participation; Women's rights; Middle East and North Africa.

JEL classifications: J16, J21, D74, I31

1. Introduction

Gender equality and women's empowerment matter both intrinsically and instrumentally. It not only directly affects basic human rights for approximately half of the population but has also been recognized to facilitate economic and human development (Nussbaum, 2001; Klasen, 2002; World Bank, 2011; Duflo, 2012). Although the international community has committed itself to eliminate gender inequalities by 2030 (SDG 5), large gender gaps persist in employment, political empowerment, access to assets, and legal rights and freedoms in many parts of the world, particularly in the Middle East and North Africa (MENA) (Vásquez and Porčnik, 2019; WEF, 2019). Informal institutions such as social norms are a key factor in explaining differences in gender outcomes across countries and world regions (World Bank, 2011). For instance, female labor force participation (FLFP) in 2019 was merely 20.2 percent for MENA countries on average, the lowest figure among all world regions and only a slow increase from 17.4 percent in 1990 (ILO, 2020). The low status of women in MENA countries has often been linked to Arab culture, to Islam being a source of legislation as well as to the petrol economy (Ross, 2008; Gouda and Potrafke, 2016; Kostenko et al., 2016).

It has been argued that the division of labor between women and men has been largely persistent over time mainly because of deep historical and cultural roots that determine gender norms (Boserup, 2007; World Bank, 2011; Alesina et al., 2013). However, in spite of this inertia, gender roles do constantly adjust to demographic, economic, technological, and political shocks (e.g., Goldin and Katz, 2002; Greenwood et al., 2005; Fogli and Veldkamp, 2011; Albanesi and Olivetti, 2016; and Teso, 2019). As an example of a major political shock, the United States experienced a steep rise in female labor force participation from 28 percent in 1940 to 36 percent in 1945 when women were needed in companies and factories to replace men who had left to serve in the war. Two generations and a series of shocks later, U.S. women had reached a participation rate of 57.5 percent in 1990 (Blau et al., 2014). In contrast, the 1979 Iranian Revolution, which replaced a secular with an Islamic government, reversed many of the achievements and rights that Iranian women had gained in the decades before. The revolutionary government, even though encouraging women's political mobilization and girls' education, enforced laws and practices unfavorable to women, barred the judiciary to women, and dismissed many professional women from government jobs

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(Keddie and Richard, 2003). In addition to macro evidence, a number of recent micro studies have shed new light on the effects of political shocks on gender equality. A series of studies exploited random assignment of gender quotas for leadership positions on Indian village councils and found that an exogenous increase in the political representation of women can improve women's outcomes both inside and outside the home (Chattopadhyay and Duflo, 2004; Beaman et al., 2012; Iyer et al., 2012; Ghani et al., 2014), and reduce perception bias towards female leaders (Beaman et al., 2012).

In recent years, several MENA countries experienced a significant political shock known as the "Arab Spring", which was mainly driven by dissatisfaction with the standard of living, poor labor market conditions, lack of political voice, and corruption (Chaney et al., 2012; Arampatzi et al., 2018; Dang and Ianchovichina, 2018). The Arab Spring protests, which rapidly spread across the MENA region within only two months after protests first broke out in Tunisia in December 2010, resulted in political changes in numerous MENA countries, including regime changes in some (Egypt, Libya, Tunisia, and Yemen). In this study, we aim to understand the effects of political shocks on women's labor market outcomes and gender norms by investigating the case of the Arab Spring.

Only few studies have investigated the effects of the Arab Spring protests on gender views and outcomes. EI-Mallakh (2018) and Bargain et al. (2019) both use two waves of data surrounding the 2011 protests in Egypt and employ a difference-in-difference approach to investigate the change in women's empowerment caused by the protests. The former finds that the protests have reduced intra-household differences in labor force participation between women and men, while the latter finds a significant improvement in women's final say regarding decisions on health, socialization and household expenditures, as well as a decline in the acceptance of domestic violence and girls' circumcision, in the regions mostly affected by the protests. Both studies focus on the case of Egypt only and might thus not be generalizable to the entire MENA region. In addition, the sample period of these studies is rather short (1 to 3 years after the protests), limiting their investigations to short-run effects.

To the best of our knowledge, Fox et al. (2016) is the only study in this literature that examines the effects of Arab Spring protests *across* countries. Using waves two (2010/11) and three (2013) of the Arab Barometer, and also employing a difference-in-

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differences approach, the authors compare changes in attitudes towards women's equality between waves and between three Arab Spring countries (defined as countries that underwent regime change) and six non-Arab Spring countries, adjusting for covariates. The study finds that support for "Muslim feminism" (an interpretation of gender equality grounded in Islam) has increased over the period, particularly in Arab Spring countries. In contrast, support for "secular feminism" (a secular, "Western" interpretation of women's rights) has declined. The authors suspect that the revolutionary sentiments that rejected authoritarian regimes, which were often oriented towards the West, would also reject the support for Western symbols including secular interpretations of women's rights. Instead, the "Arab streets" might have initiated "a Muslim feminist model that grounds gender equality in an interpretation of Islam" (Fox et al., 2016). While pointing towards an interesting phenomenon, Fox et al.'s study does not come without shortcomings. First, their baseline wave (2010/11) only allows for an examination of the period during the political uprisings rather than before the uprisings. Thus, it is unclear whether their results truly reflect the change in attitudes due to social unrests and regime change. In addition, and similar to the above papers on Egypt, all effects measured are only of short-run nature. Second, the authors' regression analysis fails to control for a number of potentially relevant individual and household characteristics. For example, household income position and marital status are both only approximated using a single binary variable, leaving concerns about potential omitted variable bias. Moreover, controls are missing for household composition. Third, their study only investigates "soft" gender equality indicators, such as attitudes towards secular/Muslim feminism but does not examine any "hard" measures such as employment.[1] Lastly, Fox et al.'s study does not provide evidence of whether their results are robust to alternative model specifications, omitted variable bias, or alternative definitions of the treatment variable.

Using the largest number of nationally representative country samples across the MENA region and the longest sample period employed so far in the literature, we study the impact of Arab Spring protests on gender equality, particularly focusing on trends

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[1] A woman's access to work and earnings (i.e., her economic empowerment) is widely recognized to be a key determinant of many other gender outcomes such as decisions on fertility, time spent in unpaid work, intrahousehold resource allocation, female life satisfaction, as well as the ability to escape from a violent partnership (Lundberg and Pollak, 1996; Doss, 2013; Bethmann and Rudolf, 2018).

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in female labor force participation and gender norms. We use micro data from up to 17 MENA countries (11 of which with before & after waves [2]) collected by the Gallup World Poll (GWP) for the period 2009 to 2018 and the protest index from Wolfsfeld et al. (2013) to account for protest intensity across countries. Similar to earlier research, our study employs a double- and triple-difference approach to isolate respective treatment effects. We find that the Arab Spring protests significantly reduced female labor force participation. In particular, a one-standard-deviation increase in the protest intensity lowered female participation rates by 3.7 percentage points, ceteris paribus. In addition, Arab Spring protests significantly reduced the likelihood of both women and men to agree to equal legal rights across genders, to women having unrestricted access to occupations, and to a woman's right to initiate a divorce.[3] The findings are confirmed by a number of robustness tests, including using alternative samples and alternative model specifications, checking for omitted variable bias, and applying an alternative measure of protest intensity.

Our findings contradict those from EI-Mallakh (2018) and Bargain et al. (2019) on the influences of Arab Spring protests on gender equality, suggesting that their findings from Egypt cannot be generalized to other MENA countries. On the other hand, our findings are consistent with those in Fox et al. (2016), which shows that the support for "secular feminism" has declined across Arab Spring countries. We argue that the protests and consequent political changes have harmed freedom rights and the secular society, which may serve as one potential mechanism behind the deteriorating effect of Arab Spring protests on gender equality. Using our data, we find that the perceived freedom in one's life and perceived freedom of the media were significantly reduced by the protests. This is consistent with recent literature suggesting a new anti-Western *zeitgeist* and a rise in Islamist-oriented parties promoting more traditional gender roles to spread with the Arab Spring (Tibi, 2013; Fox et al., 2016; Gouda and Potrafke, 2016; Feldman, 2020).

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[2] The 11 countries are Algeria, Egypt, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria, Tunisia, UAE, and Yemen. Among those, Kuwait does not provide information on labor force participation, while Algerian surveys do not have gender norms information (Saudi Arabia lacks one of the three gender norms variables). Thus, we will have 10 countries with before and after waves for each outcome variable in the regression analysis except for a wife's right to initiate a divorce (9).

[3] There is no significant gender difference in the negative impact of protests on the three gender norms, as tested in triple-difference models. Results are available upon request.

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Our study enriches the literature on the effect of the Arab Spring on gender equality by exploiting a larger dataset, using both soft and hard gender outcomes, employing more rigorous robustness checks compared to past related literature, as well as by exploring potential mechanisms that could help explain the effects. At a more general level, our study contributes to a growing literature on the effects of demographic, economic, technological, and political shocks on gender equality or women's empowerment (e.g., Goldin, 1991; Ager et al., 2017; and Grosjean and Khattar, 2019).[4] We further contribute to the literature on the relationship between politics, religion, and gender in the Arab world. Gouda and Potrafke (2016) argue that discrimination against women is more pronounced in countries where Islam is the source of legislation. Moreover, Kostenko et al. (2016), using pre-Arab-Spring data, find that correlation between support for democracy and gender equality is surprisingly low in Arab countries. They also find that younger generations are the most patriarchal in their gender attitudes, a phenomenon they refer to as "retrogression of social values in the younger generations".

In addition, our study adds to the literature on the general economic and political consequences of the Arab Spring. Acemoglu et al. (2018) is the major study on the economic consequences, exploring the impact of the Arab Spring on stock market returns in Egypt. Most of the literature focuses on political consequences. Studies have shown that the Arab Spring considerably changed the political landscape in the MENA region, enabling Islamists to move to the forefront of Arab politics as power holders (e.g., Al-Anani, 2012; Chamkhi, 2014; and Netterstrøm, 2015). In the meantime, countries have settled into diverse forms of government where autocratic and democratic features are combined (Miller et al., 2012; Roy, 2012; Abushouk, 2016), whereas ethnic politics and religious divides affect Arab dictators' responses to the Arab Spring protests (Hodler, 2018).

The remainder of this article is organized as follows. Section 2 introduces data, variables, summary statistics, and the empirical strategy. Section 3 reports estimation results, first of the baseline regressions, then of heterogeneity analysis, followed by a number of robustness checks and tests for parallel trends. Lastly, potential mechanisms are discussed. Section 4 concludes.

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[4] Our study also contributes to a growing literature on protests (e.g., Campante and Chor, 2012, 2014; Madestam et al., 2013; Aidt and Franck, 2015).

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2. Data and Empirical Approach

2.1 Data and variables

This study uses data from the Gallup World Poll (GWP) which continually surveys residents in more than 150 countries around the world. According to Gallup (2018), the GWP represents more than 99 percent of the world's adult population. Typical GWP surveys collect samples from 1,000 individuals in each country, including both core and supplementary questions. In many countries, surveys are collected on an annual basis. For the purpose of this study, we use all available surveys between 2009 and 2018 for up to 17 MENA countries. Full information on all variables required for our main estimations is available for a sample of 143,478 adults in working age (15 to 64). When excluding countries that have only a before- or an after-Arab Spring survey wave, yet not both, we are left with a final sample of 112,124 observations across 10 MENA countries and between 2009 and 2018. This sample will be used for the analysis of Arab Spring exposure on female labor force participation, and will allow us a medium-term evaluation of Arab Spring events on women's labor market outcomes.

[Table 1 about here]

Table 1 presents summary statistics on the variables used in this study. Overall, there is a wide gap in labor force participation between females (26.3 percent) and males (73.1 percent) across the Arab region. During the period of interest, Gallup also collected questions on attitudes towards women's rights, however only in 2009 and 2011. Thus, the number of observations in these gender norms' variables is substantially smaller than for labor market outcomes. Observing gender norms in 2009 and 2011 (during and right after Arab Spring protests) will allow us to conduct an evaluation of short-run effects. According to Table 1, approximately four out of five respondents agree to the statements that "Women and men should have equal legal rights" (*equal rights across gender* hereafter) and that "Women should be allowed to hold any job that they are qualified for outside the home" (*women's unrestricted access to occupations*). In contrast, only 57.6 percent agree to the statement "Women should have the right to initiate a divorce" (*women's right to initiate divorce*).

The protest index used in this paper is taken from Wolfsfeld et al. (2013) and measures the "level of *significant protests* during the most important weeks of the Arab Spring". Wolfsfeld et al.'s protest measure focuses on the most active week of protest in each

country and on protests that involved at least one thousand participants (= "significant protest"). The authors examine a total of eight days from the first significant protest of the chosen week. The scale ranging from 0 to 8 indicates the number of days on which significant protests took place during the most intense week in each country. As a robustness check we will also use an alternative protest measure proposed by Steinert-Threlkeld (2017), which is the number of protests from November 1, 2010 through December 31, 2011 based on the Integrated Conflict Early Warning System (ICEWS) machine-coded event data (Boschee et al., 2015). The distribution of protest measures by country can be found in Table A1 in the appendix. The Arab Spring first broke out in Tunisia on December 18, 2010, and rapidly spread throughout the Arab world during the next two months. According to both protest measures, Arab Spring protests turned out to be strongest in Egypt, Syria, Yemen, Tunisia, Bahrain, Libya, and Algeria.

2.2 Empirical strategy

Pooling the Gallup World Poll 2009~2018 for all countries with at least one before and one after survey wave, we can estimate a difference-in-difference model as follows:

$$y_{ijt} = \beta_0 + \beta_1 Protest_j \times Post + \beta_2 Post + \beta_3 Protest_j + \delta X_{ijt} + \theta X_{ijt} \times Post + \sigma_j + \rho_t + \varepsilon_{ijt},$$

(1)

where i, j, and t denote individual, region, and year respectively.[5] y_{ijt} represents the main outcome, namely labor force participation and gender norms (*equal rights across gender*, *women's unrestricted access to occupations*, and *women's right to initiate divorce*). $Post$ is the time dummy equal to 1 for the post-Arab Spring period (2011 onward) and 0 for the base period (2009~2010), and $Protest_j$ is the treatment variable indicating the protest index, ranging from 0 to 8, where a larger number means a higher level of protests.[6] The coefficient β_1 is the difference-in-difference estimator, representing the effect of protest intensity on our outcome variables. Coefficients β_2

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[5] We decided to use region (within-country regions or provinces) instead of country to control for more precise spatial effects.

[6] As described in the earlier section, protest intensity is measured at the country level, not at the (within-country) regional level. While the latter would have been preferred, such data are not available across the MENA region.

and β_3 capture the overall effect of the Arab Spring that is common to all the countries, and the average difference between the treatment and control groups, respectively.

Covariates X_{ijt} include individual characteristics (female, age groups, birth cohorts, education level, marital status, immigrant status, Muslim dummy) and household characteristics (household size, number of children aged 0 to 14, income quintile dummies, level of urbanization dummies). They help to control for the difference in observable characteristics between the treatment and control groups and may therefore improve the precision of the model. We further control for the interactions of $Post$ and covariates X_{ijt} to deal with the potential diverging trends in observables which may cause divergent trends in our outcome variables. The terms σ_j and ρ_t denote region and year dummies, respectively.[7] The error term is denoted by ε_{ijt} and is assumed to be well-behaved. Equation (1) can be estimated separately for female and male samples using a linear probability model or alternatively a probit/logit estimator. We further correct standard errors for clustering at the regional level. For the case of gender norms, Equation (1) will be estimated only over the two available years 2009 and 2011. In this case, β_1 will show us whether and how gender norms were affected by the Arab Spring in the short run.

While Equation (1) is the appropriate model for gender norms, it is not sufficient to isolate sex-specific impacts on labor force participation. For example, a negative coefficient estimate for β_1 in a regression across the female sample could just reflect worsening labor markets for everyone in protest countries, rather than a weakening of women's relative position. Thus, in order to test if there is any gender difference in the impact on labor force participation, we extend Equation (1) to a triple-difference model:

$$y_{ijt} = \gamma_0 + \gamma_1 Protest_j \times Post \times Female_{ijt} + \gamma_2 Protest_j \times Post + \gamma_3 Protest_j \times Female_{ijt} + \gamma_4 Post \times Female_{ijt} + \gamma_5 Post + \gamma_6 Protest_j + \delta X_{ijt} + \gamma X_{ijt} \times Post + \sigma_j + \rho_t + \varepsilon_{ijt}, \tag{2}$$

where the outcome variable y_{ijt} indicates labor force participation of individual i in region j in year t. The key coefficient is then γ_1 which denotes gender inequality (the difference between females and males) in the impact of the Arab Spring on labor force

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[7] ρ_t will disappear from the regressions for gender norms as there is only one pre- and one after-treatment wave of data.

participation, while γ_2 is the impact of the Arab Spring on males' labor force participation.

Several sensitivity checks will be conducted to assess the robustness of the above empirical model and our baseline results. First, alternative samples will be used in order to assess the robustness of the one used in the baseline analysis. Second, various alternative model specifications will be employed. Third, we will use an alternative protest measure (Steinert-Threlkeld, 2017). Fourth, we will test for potential selection on unobservables following Altonji et al. (2005) and Oster (2019). Lastly, we will conduct several tests to provide evidence for the parallel trends assumption.

3. Results

3.1 Arab Spring exposure and women's outcomes

Table 2 presents results of estimating double- and triple-difference regressions in Equations (1) and (2) for labor force participation (LFP) over a pooled sample of 112,124 individuals from 10 MENA countries surveyed between 2009 and 2018. Column (1) presents results of estimating over the female sample only and suggests that FLFP was slightly lower in protest countries prior to the outbreak of Arab Spring protests (*Protest*). Moreover, across MENA countries FLFP has increased by approximately 8.5 percentage points from before to after Arab Spring (*Post*), indicating better access for Arab women to labor markets in general. However, the interaction term between treatment and the post dummy (*Post × Protest*) is negative and highly statistically significant, indicating that participation increased less for women in protest countries compared to those in non- or low-protest countries.

It could be argued that, rather than suggesting a deterioration of women's relative status, in protest countries LFP might have fallen for both genders due to civil unrest and its negative impact on labor markets in general. In order to test for this possibility, we can use male labor force participation for comparison and examine if women were in fact worse off in Arab Spring countries. Column (2) uses the entire sample of female and male potential workers and expands the analysis to a triple-difference model, as shown in Equation (2). First, it can be noted that female participation rates were 46.8 percentage points lower than those of their male counterparts over the entire period

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from 2009 to 2018. Second, male LFP was not negatively affected by Arab Spring protests (*Post × Protest*), ruling out the possibility of labor markets deteriorating the same for all following the protests. Third, the improvement of female participation rates post-Arab Spring across all countries (*Post × Female*) is also confirmed in the triple-differences model (+8.55 percentage points). Lastly, and most importantly for this study, the triple-difference term (*Post × Protest × Female*) suggests that female participation rates were negatively affected by Arab Spring protests, holding everything else constant. The coefficient estimate (-0.0112) is statistically significant at the 1-percent level and suggests that, ceteris paribus, a one-standard-deviation increase in the level of protests lowered female participation rates by 3.7 percentage points in the post-protest period. Our FLFP results are in opposition to the two studies on the Egyptian Arab Spring which find improvement in women's status indicated by improvements in relative FLFP (El-Mallakh et al., 2018) and women's intrahousehold decision-making power (Bargain et al., 2019).

[Table 2 about here]

As discussed above, the division of labor between women and men is rooted in gender norms, i.e. socially prescribed gender roles. Table 3 shows the results of estimating effects of Arab Spring exposure on gender norms, more specifically on attitudes towards women's rights. Regressions were run over 10 countries and the years 2009 (before) and 2011 (after), therefore measuring *short-run* changes in attitudes around the Arab Spring. Estimations were carried out using the entire sample of both female and male respondents in working age. Estimates from Table 3 indicate that across all three outcomes, females and non-Muslims are significantly more likely to support an expansion of women's rights. Moreover, a significant shift towards the acceptance of a woman's right to initiate a divorce appears to have taken place between 2009 and 2011 across the region. Ceteris paribus, agreement increased by a staggering 30.5 percentage points. The interaction between treatment and the post period (*Post × Protest*) is negative and statistically significant for all three outcomes. Coefficient estimates suggest that a one-standard-deviation increase in protests is associated with a reduction in the support for the three women's rights statements by 3.4, 4.2 and 6.0 percentage points, respectively. Table 3 results indicate that gender norms were negatively affected by Arab Spring protests already in the short-run, confirming negative medium-run effects on FLFP found in Table 2. Our results pose a challenge to the existing literature

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on Egypt which found that the Arab Spring improved gender attitudes, measured by a lower acceptance of domestic violence and girls' circumcision (Bargain et al., 2019). However, our results do lend support to the findings in Fox et al. (2016) that the Arab Spring reduced the support for "secular feminism" in the MENA region.

[Table 3 about here]

3.2 Heterogeneity in treatment effects

How national protests affect individuals can differ according to their demographic characteristics such as age, education, and location. Table 4 examines heterogeneity in treatment effects on LFP and gender norms by estimating separate regressions for young versus old respondents, urban versus rural, and those with low, medium, and high levels of education.[8] Triple-difference coefficients are presented for LFP, and double-differences for gender norms following our preferred baseline models in Tables 2 and 3. Panel A of Table 4 suggests negative impacts of the Arab Spring on FLFP particularly for women older than 32 ("old"), for women living in or adjacent to large cities ("urban"), as well as for women with higher levels of education. According to Panel B, the view that women and men should have equal legal rights was affected more negatively by Arab Spring protests within older, rural, and low-educated population groups. Panel C examines heterogeneity in Arab Spring effects on the agreement that women should be allowed to hold any job. While there is no significant difference between young and old, it seems that rural areas turned more conservative as a result of the protests. Among education groups, the negative effect was strongest for those with low and high education. Lastly, Panel D disentangles the protests' negative effect on the support for women's rights to initiate a divorce. This negative effect is found strongest among the young, educated, urban population, the group which constituted the major source of protestors.

[Table 4 about here]

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[8] "Young" includes all individuals up to the median sample age (32). "Urban" includes those that live in large cities or suburbs of large cities. An individual is considered to have "low education" if she has completed elementary education at most; "medium education" refers to having secondary or some tertiary education; "high education" means that the person has completed a 4-year college or above.

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3.3 Robustness checks

A series of tests was conducted to check the robustness of our baseline results in Tables 2 and 3 to variations in the sample, in model specification, in the protest measure, and to potential omitted variable bias. We start with results from using alternative samples in Table 5. In Panel A, the sample is restricted to individuals in prime working age (25 to 64), which meant dropping the population 15 to 24 which could be seen as still in education and thus potentially affecting LFP results. Restricting the sample to prime-work age confirms our baseline results. The triple-difference coefficient for LFP rises from |-0.0112| to |-0.0146| in absolute terms while maintaining significance at the the 1-percent level. The Arab Spring's negative effect on *equal rights across gender* is slightly more pronounced, while it is slightly weaker for *women's unrestricted access to occupations* and *women's right to initiate divorce*. Panel B re-estimates baseline regressions, yet this time excluding countries that entered into civil war in the aftermath of the Arab Spring. Since women's rights often suffer more from war than men's, it should be examined whether effects hold even after excluding civil war countries. Panel B confirms baseline triple-difference effects for FLFP and for *equal rights across gender*. Coefficients for *women's unrestricted access to occupations* and *women's right to initiate divorce* are still negative, yet no longer significant. Panel C of Table 5 estimates with the largest available sample, adding countries that only have a before- or an after-Arab-Spring survey wave, yet not both. This allows expanding the dataset to 17 countries for LFP regressions and 13 countries for gender norms regressions. Using all countries reduces the negative impact of protests on female participation rates; however, baseline results are confirmed generally.

[Table 5 about here]

Table 6 presents the results of using alternative model specifications. Panel A reports marginal effects of *logit* regressions for the four outcome variables in columns (1)-(4). The triple-difference estimate for FLFP in column (1) is -0.00811 and significant at the 5-percent level, which is close to the baseline coefficient in column (2) of Table 2. The three coefficients for gender norms in columns (2)-(4) are all significant and have very similar magnitudes as those in the baseline results in Table 3. This confirms that our estimates are also robust to nonlinear model specification. In Panel B, the original protest index was converted into a binary treatment variable, with value 1 if the original

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protest index is 8 or 4, and 0 otherwise. The coefficient for the FLFP is -0.0869 and statistically significant at the 1-percent level. The coefficients for the three gender norms are also negative and statistically significant at the 5- or 1-percentlevel. In Panel C, we further report results from regressions using a binary treatment in combination with propensity score matching. We follow the method proposed by Hirano et al. (2003) and adopted in Bargain et al. (2019) to reweight the estimations using the inverse propensity score.   Denote p_i the propensity score for each individual i from kernel matching. The weights for the treated and control observations are given by $1/p_i$ and $1/(1 - p_i)$, respectively. The results in Panel C appear to be similar to those in Panel B in terms of size and significance level, except that the coefficient in the FLFP regression is reduced to be statistically significant only at the 10-percentlevel (*p-value*=0.066). Finally, an additional model specification test (not reported in the Table) was conducted in which region-specific trends were added to the baseline model for labor force participation. The resulting triple-difference coefficient is -0.0115 (cp. to baseline -0.0112) and statistically significant at the 1-percent level.[9]

[Table 6 about here]

Table 7 presents results from using the alternative protest measure suggested by Steinert-Threlkeld (2017). Once again, our baseline findings for both FLFP and gender norms are confirmed. The treatment effect for FLFP of -0.0314 implies that a one-standard-deviation increase in the *Ln number of protests* reduces female participation rates by 3.9 percentage points, which is very close to the 3.7 percentage points impact estimated using Wolfsfeld et al. (2013)'s protest index in Table 2. The treatment effect for the three gender norms is -0.0196, -0.0270, and -0.0364 respectively, implying that a one-standard-deviation increase in the *Ln number of protests* reduces the agreement to the three women's rights statements by 2.5, 3.4, and 4.6 percentage points, respectively, which is close to the baseline effects found in Table 3.

[Table 7 about here]

3.4 Robustness to omitted variable bias

One may still be concerned that some omitted variables correlated with protests may bias our results, despite the various robustness checks above. In this section we exploit

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[9] We were not able to carry out the same test for gender norms given that T=2.

selection on observables to gauge the bias from unobservables following the method introduced by Altonji et al. (2005) and further developed by Oster (2019). To see how it works, consider two regressions for the same outcome variable: one with a restricted set of covariates, and another with the full set of covariates (as shown in Equation 1). Denote the estimated treatment effect from the restricted and full model $\hat{\beta}_r$ and $\hat{\beta}_f$, respectively. The corresponding R-squared of the two regressions is $\hat{R}_r$ and $\hat{R}_f$. Altonji et al. (2005) propose the test statistic $\delta = \hat{\beta}_f / (\hat{\beta}_r - \hat{\beta}_f)$ to assess the strength of the likely bias arising from unobservables, as the ratio indicates the relative degree of selection on unobservables and observables that would produce a zero treatment effect. In other words, the impact of unobservables must be at least δ times greater than the observables to overturn the results. Nunn and Wantchekon (2011) adopt this method to substantiate the estimated negative impact of historical slave trade on contemporary trust in Africa.

Oster (2019) proposes the following bias adjusted treatment effect, taking into account both the estimated coefficients of interest and the R-squared of the restricted and full model:

$$\beta^* = \hat{\beta}_f - \delta\left(\hat{\beta}_r - \hat{\beta}_f\right) \frac{R_{max} - \hat{R}_f}{\hat{R}_f - \hat{R}_r}. \tag{3}$$

R_{max} denotes the R-squared from a hypothetical regression of the outcome variable on all observable and unobservable characteristics, which is no bigger than 1. R_{max} is suggested to be $1.3\hat{R}_f$ for empirical analysis by Oster (2019). She suggests two related methods to assess the bias from unobservables using selection on observables. The first approach is to calculate how important the unobservables are to explain away the results, that is to calculate δ when $\beta^* = 0$. We thus can derive δ from Equation (3), $\delta = \frac{\hat{\beta}_f}{\hat{\beta}_r - \hat{\beta}_f} \frac{R_{max} - \hat{R}_f}{\hat{R}_f - \hat{R}_r}$. Note that $\delta = \frac{\hat{\beta}_f}{\hat{\beta}_r - \hat{\beta}_f}$ used in Altonji et al. (2005) and Nunn and Wantchekon (2011) implicitly assume that $\frac{R_{max} - \hat{R}_f}{\hat{R}_f - \hat{R}_r} = 1$, which implies that $R_{max} = \hat{R}_f + \left(\hat{R}_f - \hat{R}_r\right)$. A greater absolute value of δ implies a smaller selection effect on observables, and being greater than one can generally be considered robust (Altonji et al., 2005). The second approach is to calculate a treatment effect β^* under the assumption that the unobservables are as important as the observables, i.e. $\delta = 1$. The

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treatment effect β^* is thus given by $\beta^* = \hat{\beta}_f - \left(\hat{\beta}_r - \hat{\beta}_f\right)\frac{R_{max} - \hat{R}_f}{\hat{R}_f - \hat{R}_r}$. When the bias-adjusted effect β^* is similar to the estimates in the full model, we conclude that the bias from the unobservables is unlikely to be significant. The closely-related research on the Arab Spring and female labor market outcomes by El-Mallakh et al. (2018) assesses selection on unobservables following Altonji et al. (2005) and Oster (2019).

We report the results of the two approaches in Table 8. Columns (1) and (2) report the coefficient estimates of the variable of interest (female labor force participation and gender norms) and R-squared. Column (1) reports coefficients of the restricted model, controlling only for region and year fixed-effects only. Column (2) reports coefficients of the model with the full set of controls, as shown in Equations (1) and (2). In column (3), we present the value of relative degrees of selection between unobservables and observables, δ, that would be necessary to attribute the entire results to the selection effect, under $R_{max} = \hat{R}_f + \left(\hat{R}_f - \hat{R}_r\right)$ following Altonji et al. (2005) and Nunn and Wantchekon (2011). In column (4) we report δ under $R_{max} = 1.3\hat{R}_f$ following Oster (2019). All the estimated δ in the two columns are substantially larger than one, indicating that our regressions are unlikely to be biased by omitted variables (Altonji et al., 2005).

In columns (5) and (6), we report the bias-adjusted effect β^* assuming $\delta = 1$ (Oster, 2019). The difference between the two columns is $R_{max} = \hat{R}_f + \left(\hat{R}_f - \hat{R}_r\right)$ in column (5), and $R_{max} = 1.3\hat{R}_f$ in column (6). All the coefficients in the two columns are very similar to the corresponding coefficients in the full model in column (2). Hence, we conclude that it is unlikely that unobserved factors could have significantly biased our results.

[Table 8 about here]

3.5 Validity of the parallel trends assumption

The key assumption of difference-in-difference regressions is the parallel trends assumption. If there were omitted time-varying heterogeneous shocks to regional labor markets or to gender norms, our results could be biased. Though we already showed in Section 3.4 that omitted variable bias is unlikely to be present in our regressions, we

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will conduct further tests on the validity of our models in this section. First, we exploit the pre-Arab Spring data to perform a falsification test. We have access to two waves of data (2009 and 2010) for labor force participation prior to the Arab Spring.[10] Therefore, we can conduct a placebo test to assess whether FLFP in 2009 and 2010 were affected by the subsequent 2011 protests. We define a pseudo post-treatment variable that takes a value of "1" for respondents observed in 2010 and "0" for those observed in 2009. Regression results are reported in Table 9 and follow the same structure as in Table 2. The coefficients of the pseudo treatment on FLFP in both columns are not statistically significant. We thus conclude that our results are not likely to be biased by differing pre-existing regional labor market trends. Second, we exploit external measures of women-specific freedom from the Human Freedom Index (Vásquez and Porčnik, 2019) to show the validity of the parallel trends assumption for gender norms. In Figure 1, we present the trends for women's security and safety (Panel A) and women's movement (Panel B). The definition of the high-intensity group and the low-intensity group is consistent with the binary treatment variable discussed in Section 3.3. The pre-2010 trends for the two groups turn out to be almost parallel for both measures. This supports the parallel trends assumption for gender norms.

[Table 9 about here]

[Figure 1 about here]

3.6 Mechanisms

Having found negative effects on women's outcomes triggered by Arab Spring events, the question of *how* and *why* this occurred needs to be answered. Earlier literature suggests that the Arab Spring promoted not only democratic ideas but also a new anti-Western *zeitgeist* and led to a rise in Islamist-oriented parties. Oftentimes, these parties were aiming to establish Sharia-based regimes prescribing behavioral restrictions in daily life including more traditional gender roles (Tibi, 2013; Fox et al. 2016; Gouda and Potrafke, 2016; Feldman, 2020). Recent political science studies have argued qualitatively that the changes underway in Arab Spring countries may lead to various potential destinations that differ from liberal democracy for three reasons: the absence of cultural prerequisite for democracy, the challenges of tribal and Islamic values that

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[10] We do not have more than one data wave for gender norms in most countries prior to the Arab Spring, thus we cannot perform the placebo test for gender norms.

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have cultivated a culture of submission to authority, and the conflict between secularists and Islamists (Miller et al. 2012; Abushouk, 2016). In this section, we try to demonstrate quantitatively that the Arab Spring has failed to lead to the process of democratization in general and, instead, led to a shift in the Arab *zeitgeist* towards a less liberal and less secular society.

First, we discuss the effects of the Arab Spring protests on perceived freedom, using data from the GWP. Table 10 presents the results of double-difference regressions for four measures of perceived freedom using Equation (1). We show that self-reported freedom in life significantly reduced in Arab Spring countries in the aftermath of the protests. Similarly, the perceived freedom in media was also negatively affected. The coefficients of freedom in speech and freedom in assembly are also negative, though not statistically significant.[11] Second, consistent with our regression results, Figure 1 suggests that women's freedom was curbed substantially after the Arab Spring, especially in countries with high intensity of protests. Specifically, the two women-specific freedom measures sharply decreased right after the Arab Spring. The decline in both measures appears to be larger for the high-intensity group relative to the low-intensity group, and the recovery in the measure of women's movement also turns out to be slower for the high-intensity group.

[Table 10 about here]

4. Conclusion

This study analyzed the impact of Arab Spring protests on gender equality across the Middle East and North Africa. Exploiting the variation of protest intensity across MENA countries and using multiple waves of the Gallup World Poll surrounding the Arab Spring events, our analyses reveals that, on average, women's status and gender equality experienced a setback in protest countries. On the one hand, protests lowered the support for women's rights among both women and men, in particular for women's unrestricted access to occupations, for their right to initiate a divorce, and for overall gender equality in legal rights. On the other hand, protests reduced women's access to

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[11] This might be due to the much smaller number of observations in these two regressions. In fact, only 7 countries and fewer waves of data are covered in these regressions.

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jobs and earnings as female labor force participation fell significantly. Findings suggest that a one-standard-deviation increase in the intensity of protests lowered female labor force participation by 3.7 percentage points and reduced support for women's rights by 3.4 to 6.0 percentage points, ceteris paribus. Negative effects on female labor force participation were most pronounced among women in prime work age, urban women, and more educated women. In contrast, the negative effect on the support for gender equality in legal rights was strongest among the rural and low-educated population. Our results are robust to different samples, alternative model specifications, omitted variable bias, as well as to an alternative protest measure from Steinert-Threlkeld (2017).

The present study's findings are in line with Fox et al. (2016) who found that Arab Spring protests reduced support for "secular feminism". However, our findings stand in opposition to El-Mallakh (2018) and Bargain et al. (2019) who showed for the case of Egypt that women's status improved particularly in high-protest regions, suggesting that the Egyptian experience might not be generalizable to the whole region. Our study also adds to the growing literature on the political and religious determinants of gender inequality and the political and economic impacts of the Arab Spring.

Regarding potential mechanisms that help explain our findings, we find evidence that Arab Spring protests and consequent political changes reduced freedom rights in the affected countries. In particular, we find that the perceived freedom in one's life and perceived freedom of the media were both significantly reduced by the protests. Moreover, women's security and safety and women's freedom of movement fell more strongly in high-protest countries. This appears to be in line with earlier literature suggesting a new anti-Western *zeitgeist* that spread with the Arab Spring and a rise in Islamist-oriented parties aiming to establish Sharia-based regimes that are likely to regress gender roles and personal freedom rights (Tibi, 2013; Fox et al., 2016; Gouda and Potrafke, 2016; Feldman, 2020). Our work also confirms Kostenko et al. (2016) who found that correlation between support for democracy and gender equality is very low in Arab countries.

Our study suggests that a pro-democracy movement can have unintended consequences. The Arab Spring has opened the doors of power for Islamists and triggered a long process of change and transition that will put Islamists' theories and practices to the test

(Al-Anani, 2012). Future empirical research can look further into longer-term effects of the Arab Spring on various democratic values, including women's rights, when more data become available.

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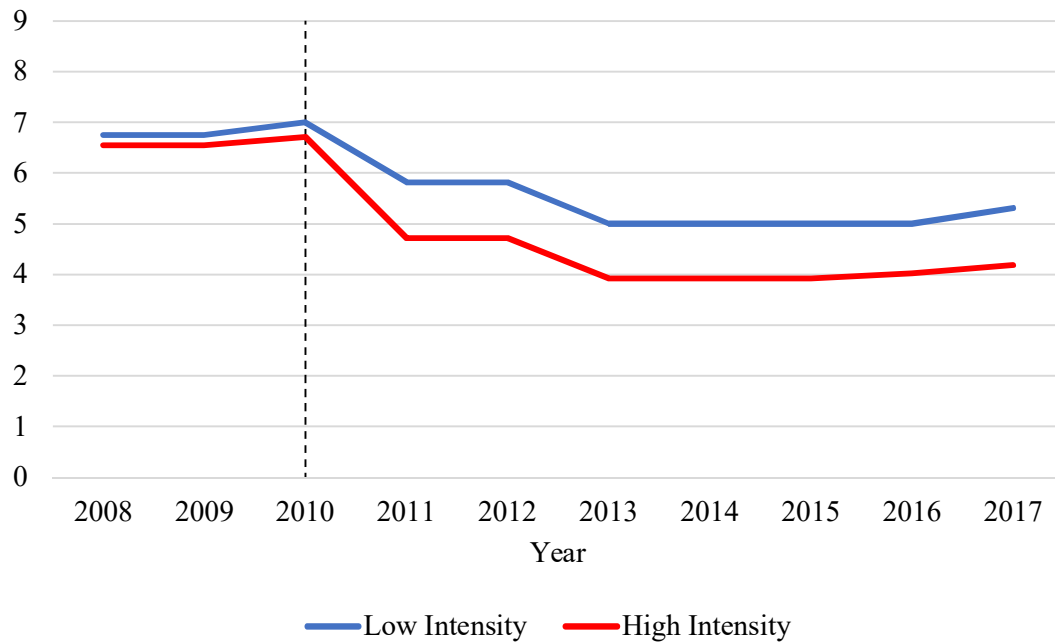Boserup, E. (2007). *Woman's role in economic development*. Earthscan.

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Panel A. Women's Security and Safety

Low Intensity — High Intensity

Panel B. Women's Movement

Low Intensity — High Intensity
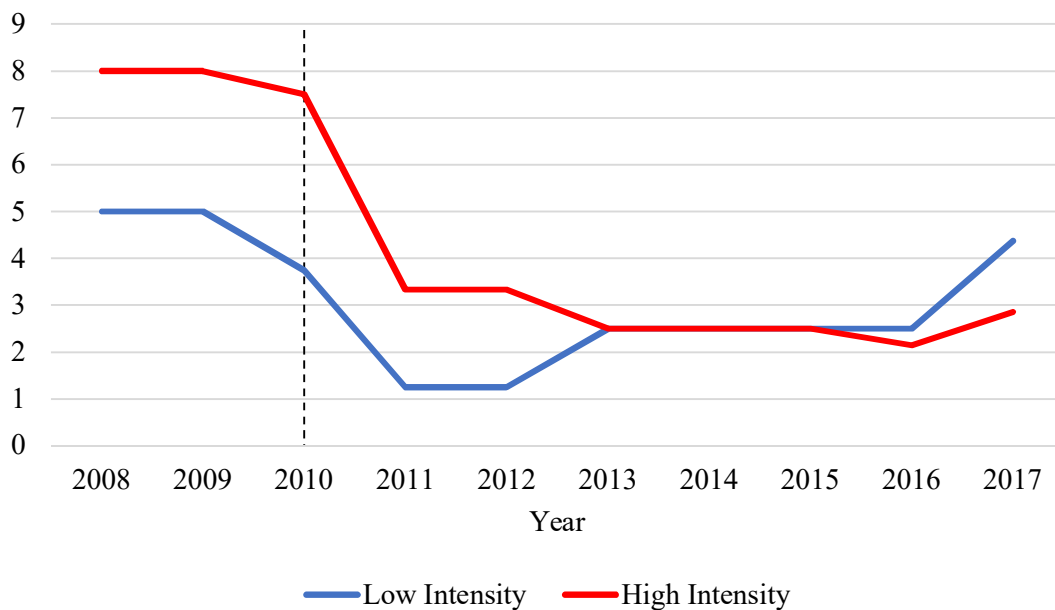
Figure 1: Trends of Women-specific Freedom by Protest Intensity

Data Source: Human Freedom Index (2019)

Notes: Women's security and safety includes two components: female genital mutilation and inheritance rights. Women's movement measures whether women and men have the same legal rights to apply for national identity cards, to apply for passports, and to travel outside the country. The values of both measures range from 0 to 10, with a higher value representing a higher degree of freedom. The figure is for the 11 countries in our baseline regression analysis.

Table 1: Summary Statistics

	Mean	Std. Dev.	Min	Max
Labor force participation	0.499	0.500	0	1
LFP (females)	0.263	0.441	0	1
LFP (males)	0.731	0.443	0	1
Gender attitudes (1=yes, 0=no)				
Equal rights across gender ("Women and men should have equal legal rights.")	0.803	0.398	0	1
Women's unrestricted access to occupations ("Women should be allowed to hold any job [...].")	0.794	0.405	0	1
Women's right to initiate divorce ("Women should have the right to initiate a divorce.")	0.576	0.494	0	1
Arab Spring indicators				
Protest index, Wolfsfeld et al. (2013)	5.060	3.300	0	8
Ln number of protests, Steinert-Threlkeld (2017)	6.411	1.250	4.06	8.13
Post (1 if year $\geq$ 2011)	0.508	0.500	0	1
Individual characteristics				
Age 15-24	0.333	0.471	0	1
Age 25-39	0.374	0.484	0	1
Age 40-54	0.216	0.411	0	1
Age 55+	0.078	0.267	0	1
Female	0.497	0.500	0	1
Completed elementary or less	0.438	0.496	0	1
Secondary or some tertiary	0.473	0.499	0	1
Completed 4-year college	0.089	0.285	0	1
Never married	0.413	0.492	0	1
Married	0.538	0.499	0	1
Separated	0.002	0.039	0	1
Divorced	0.020	0.139	0	1
Widowed	0.028	0.166	0	1
Immigrant	0.076	0.265	0	1
Muslim	0.942	0.234	0	1
Household characteristics				
HH size	4.328	1.950	1	30
No of children 0-14	1.870	2.215	0	52
Income quintile	3.025	1.407	1	5
Rural area/ farm	0.228	0.420	0	1
Small town/ village	0.168	0.374	0	1
Large city	0.416	0.493	0	1
Suburb of large city	0.188	0.391	0	1

Notes: N=112,124 for all except attitude variables. All available GWP survey rounds from 2009 to 2018 for MENA countries were pooled. Countries that do not have both a before- and an after-Arab Spring survey wave were excluded from the sample. Sampling weights are applied.

Table 2: Effects of Arab Spring Exposure on Female Labor Force Participation
(Double and Triple Differences)

	(1)	(2)
	Labor Force Participation	
	Female	*Female & Males*
Protest	-0.00784***	-0.00144
	(0.00238)	(0.00242)
Post	0.0851*	-0.0210
	(0.0452)	(0.0356)
Post × Protest	-0.00849***	-0.00242
	(0.00275)	(0.00223)
Female		-0.468***
		(0.0320)
Female × Protest		0.00336
		(0.00537)
Post × Female		0.0855***
		(0.0272)
Post × Protest × Female		-0.0112***
		(0.00387)
Individual Controls	YES	YES
Household Controls	YES	YES
Controls × Post	YES	YES
Region FE (Within-country regions)	YES	YES
Year FE	YES	YES
Observations	54,809	112,124
No of countries	10	10
R-squared	0.184	0.302

Notes: Robust standard errors in parentheses are clustered at the region level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Effects of Arab Spring on Attitudes Towards Women's Rights (Double Differences)

	(1) *Equal rights across gender*	(2) *Women's unrestricted access to occupations*	(3) *Women's right to initiate divorce*
Protests	0.0138***	-0.00825***	0.0320***
	(0.00165)	(0.00180)	(0.00300)
Post	0.0177	0.0771	0.305***
	(0.0410)	(0.0501)	(0.0706)
Post × Protests	-0.0102**	-0.0127***	-0.0182***
	(0.00455)	(0.00396)	(0.00634)
Female	0.129***	0.149***	0.220***
	(0.0121)	(0.0141)	(0.0160)
Muslim	-0.0606***	-0.0495**	-0.167***
	(0.0198)	(0.0213)	(0.0238)
Individual Controls	YES	YES	YES
Household Controls	YES	YES	YES
Controls × Post	YES	YES	YES
Region FE (Within-country regions)	YES	YES	YES
Observations	25,377	25,311	22,829
No of countries	10	10	9
R-squared	0.091	0.095	0.181

Notes: Robust standard errors in parentheses are clustered at the region level, *** p<0.01, ** p<0.05, * p<0.1.

	(1) Young	(2) Old	(3) Urban	(4) Rural	(5) High education	(6) Medium education	(7) Low education
Panel A: Labor Force Participation							
Post × Protest × Female	-0.00671*	-0.0136***	-0.0143***	-0.00108	-0.0112*	-0.00789*	-0.00237
	(0.00398)	(0.00417)	(0.00463)	(0.00423)	(0.00603)	(0.00408)	(0.00568)
Observations	56,517	55,607	70,106	42,018	18,180	55,787	38,157
R-squared	0.272	0.360	0.304	0.309	0.155	0.289	0.331
Panel B: Equal rights across gender							
Post × Protest	-0.00903*	-0.0109**	-0.00327	-0.0240***	-0.00829	-0.00757*	-0.0163**
	(0.00476)	(0.00533)	(0.00499)	(0.00787)	(0.00687)	(0.00441)	(0.00682)
Observations	13,390	11,987	17,325	8,052	4,029	13,359	7,989
R-squared	0.090	0.110	0.088	0.119	0.116	0.102	0.115
Panel C: Women's unrestricted access to occupations							
Post × Protest	-0.0126***	-0.0127**	-0.00533	-0.0259***	-0.0133**	-0.0104**	-0.0142***
	(0.00422)	(0.00517)	(0.00440)	(0.00737)	(0.00571)	(0.00448)	(0.00534)
Observations	13,342	11,969	17,268	8,043	4,011	13,310	7,990
R-squared	0.101	0.103	0.093	0.122	0.100	0.107	0.107
Panel D: Women's right to initiate divorce							
Post × Protest	-0.0218***	-0.0139**	-0.0179**	-0.0127	-0.0214**	-0.0182***	-0.0148*
	(0.00699)	(0.00683)	(0.00709)	(0.0134)	(0.0106)	(0.00658)	(0.00798)
Observations	11,999	10,830	15,530	7,299	3,675	11,966	7,188
R-squared	0.188	0.190	0.187	0.183	0.237	0.193	0.166

Notes: Other control variables are same as in Tables 2 and 3. Robust standard errors in parentheses are clustered at the region level, *** p<0.01, ** p<0.05, * p<0.1. "Young" includes all individuals up to the median sample age (32). "Urban" includes those that live in large cities and suburbs of large cities.

Table 5: Robustness Checks - Alternative Samples

	(1) Labor Force Participation	(2) Equal rights across gender	(3) Women's unrestricted access to occupations	(4) Women's right to initiate divorce
Panel A: Prime work age (25-64)				
Post × Protest	0.00397	-0.0101**	-0.0115**	-0.0131**
	(0.00257)	(0.00496)	(0.00449)	(0.00646)
Post × Protest × Female	-0.0146***			
	(0.00477)			
Observations	82,677	18,133	18,073	16,349
R-squared	0.346	0.0889	0.0860	0.177
Panel B: Without war countries				
Post × Protest	-0.000728	-0.0129**	-0.00588	-0.00479
	(0.00239)	(0.00525)	(0.00409)	(0.00748)
Post × Protest × Female	-0.0120***			
	(0.00448)			
Observations	93,377	19,703	19,607	17,174
R-squared	0.318	0.0903	0.0965	0.182
Panel C: Adding countries with only before or after wave				
Post × Protest	-0.00397*	-0.00955**	-0.0120***	-0.0172***
	(0.00225)	(0.00447)	(0.00389)	(0.00646)
Post × Protest × Female	-0.00834**			
	(0.00420)			
Observations	143,478	28,175	28,086	26,371
R-squared	0.292	0.095	0.098	0.180

Notes: Other control variables are same as in Tables 2 and 3. Robust standard errors in parentheses are clustered at the region level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Regressions in panel B exclude countries that entered war after the Arab Spring, i.e. Syria and Yemen. Libya, which also entered a civil war, was not included in the baseline samples because it did not have both before and after data.

Table 6: Robustness Checks - Alternative Model Specifications

	(1) Labor Force Participation	(2) Equal rights across gender	(3) Women's unrestricted access to occupations	(4) Women's right to initiate divorce
Panel A: Logit model				
Post × Protest	-0.00363	-0.0115**	-0.0138***	-0.0189***
	(0.00237)	(0.00488)	(0.00399)	(0.00633)
Post × Protest × Female	-0.00811**			
	(0.00396)			
Observations	112,124	25,377	25,311	22,816
R-squared	0.250	0.0936	0.0991	0.144
Panel B: Binary treatment variable				
Post × Protest	-0.00410	-0.0674**	-0.0754***	-0.172***
	(0.0157)	(0.0292)	(0.0272)	(0.0381)
Post × Protest × Female	-0.0869***			
	(0.0287)			
Observations	112,124	25,377	25,311	22,829
R-squared	0.302	0.091	0.095	0.183
Panel C: Binary treatment variable with propensity score matching				
Post × Protest	-0.0122	-0.0802**	-0.112***	-0.185***
	(0.0203)	(0.0338)	(0.0319)	(0.0380)
Post × Protest × Female	-0.0616*			
	(0.0335)			
Observations	112,093	25,321	25,254	22,636
R-squared	0.317	0.090	0.102	0.193

Notes: Other control variables are same as in Tables 2 and 3. The logit models report marginal effects. Robust standard errors in parentheses are clustered at the region level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The binary treatment variable takes the value 1 if the original protest index is 8 or 4, and takes the value 0 otherwise.

Table 7: Robustness Check - Steinert-Threlkeld Protest Measure

	(1) *Labor Force Participation*	(2) *Equal rights across gender*	(3) *Women's unrestricted access to occupations*	(4) *Women's right to initiate divorce*
Post × Protest	0.000693 (0.00525)	-0.0196* (0.0111)	-0.0270** (0.0111)	-0.0364** (0.0175)
Post × Protest × Female	-0.0314*** (0.00920)			
Observations	112,124	25,377	25,311	22,829
R-squared	0.303	0.091	0.094	0.180

Notes: Other control variables are same as in Tables 2 and 3. Robust standard errors in parentheses are clustered at the region level, *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Robustness to Omitted Variable Bias

Dependent variables	(1) No controls	(2) Full set of controls	(3) δ $\beta^* = 0,$ $R_{max} = R_f - (R_r - R_f)$	(4) δ $\beta^* = 0,$ $R_{max} = 1.3R_f$	(5) Bias-adjusted effect (β^*) $\delta = 1,$ $R_{max} = R_f - (R_r - R_f)$	(6) Bias-adjusted effect (β^*) $\delta = 1,$ $R_{max} = 1.3R_f$
Female labor force participation (triple diff)	-0.00960***	-0.0112***	-7.000	-5.486	-0.0128	-0.0132
	(0.00320)	(0.00387)				
R-squared	[0.231]	[0.302]				
Equal rights across gender	-0.00751**	-0.0102**	-3.792	-3.750	-0.0129	-0.0129
	(0.00313)	(0.00455)				
R-squared	[0.064]	[0.091]				
Women's unrestricted access to occupations	-0.0148***	-0.0127***	6.048	8.063	-0.0106	-0.0111
	(0.00333)	(0.00396)				
R-squared	[0.057]	[0.095]				
Women's right to initiate divorce	-0.0193***	-0.0182***	16.545	16.149	-0.0171	-0.0171
	(0.00680)	(0.00634)				
R-squared	[0.128]	[0.181]				
Individual Controls	NO	YES				
Household Controls	NO	YES				
Controls × Post	NO	YES				
Region FE	YES	YES				
Year FE	YES	YES				

Notes: Columns (1) and (2) report the coefficient, standard error and R-squared regressions for the restricted model and the full model respectively. The coefficient of "Post × Protest × Female" is reported for labor force participation from the triple-difference regressions. The coefficient of "Post × Protest" is reported for the three gender norms. Columns (3) and (5) follow the settings in Altonji et al. (2005) and Nunn and Wantchekon (2011). Columns (4) and (6) follow the settings in Oster (2019). Robust standard errors in parentheses are clustered at the region level, *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Placebo Test for Labor Force Participation

	(1)	(2)
	Labor force participation	
	Females	*Females & males*
Pseudo Post × Protest	-0.000850	-0.0108**
	(0.00476)	(0.00477)
Pseudo Post × Protest × Female		0.00959
		(0.00602)
Individual Controls	YES	YES
Household Controls	YES	YES
Controls × Pseudo Post	YES	YES
Region FE (Within-country regions)	YES	YES
Observations	10,791	21,702
R-squared	0.138	0.330

Notes: "Pseudo Post" takes value 1 for respondents in year 2010, and 0 in year 2009. Other control variables are same as in Tables 2 and 3. Robust standard errors in parentheses are clustered at the region level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 10: Mechanism – Reduced Freedom

	(1)	(2)	(3)	(4)
	Freedom in life	*Freedom in media*	*Freedom in speech*	*Freedom in assembly*
Post × Protest	-0.0123***	-0.0156***	-0.00107	-0.00326
	(0.00371)	(0.00487)	(0.00677)	(0.0112)
Observations	137,797	74,481	14,521	13,563
R-squared	0.094	0.107	0.126	0.110

Notes: Other control variables are same as in Tables 2 and 3. Robust standard errors in parentheses are clustered at the region level, *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Country	Start date of Arab Spring related protests	Protest intensity and political outcomes[1]	Wolfsfeld et al. (2013) protest index	Steinert-Threlkeld (2017) number of protests	Countries included in baseline regressions (having both before and after waves of GWP)	2019 Female labor force participation rate (age 15-64; modeled ILO estimate) (WDI, World Bank, 2020)	Introduction of voting rights for women	2017 Human Freedom Index		Global Gender Gap Index 2020 (WEF, 2019)
								Women's Security and Safety	Women's Movement	
						(in percent)	(year)	(score 0 to 10; 10=most free)		(rank out of 153 countries)
Algeria	29-Dec-10	Government overthrown; new constitution written	8	248	✓ [3]	16.1	1962	5	2.5	132
Bahrain	14-Feb-11	Strong civil disorder and government changes	8	798		46.7	1973	5	2.5	133
Egypt	25-Jan-11	Protests, Mubarak government overthrown in Feb 2011; followed by Egyptian Crisis (2011-2014); followed by El-Sisi government	8	3379	✓	23.8	1956	0.65	2.5	134
Iraq	12-Feb-11	Protests ended 23 Dec 2011; followed by civil war	4	585	✓	12.2	1980	4.6	2.5	152
Iran	14-Feb-11	Sustained street demonstrations	2	NA		18.9	1963	5	0	148

Country	Date	Description								
Jordan	14-Jan-11	Protests, government changes, constitutional changes, new early elections in 2012	4	511	✓	15.3	1974	5	0	138
Kuwait	19-Feb-11	Protests and government changes	1	161	✓[2]	51.5	2005	5	5	122
Lebanon	27-Feb-11	Protests and government changes	1	261	✓	25.4	1952	6.25	10	145
Libya	17-Feb-11	Government overthrown in Aug 2011; followed by Libyan Crisis	8	663		36.4	1964	8.75	7.5	NA
Morocco	20-Feb-11	Protest and government changes	2	298		23.2	1963	5	7.5	143
Oman	17-Jan-11	Protests (ended in May 2011), minor government changes	0	150		32.5	2003	5	2.5	144
Qatar		No significant protests	0	29		58.1	1999	5	0	135
Saudi Arabia	11-Mar-11	Minor protests; economic concessions; expansion of women's rights	0	156	✓[4]	23.3	2015	5	0	146
Syria	26-Jan-11	Civil uprising; followed by Syrian Civil War from 15 Mar 2011	8	2057	✓	15.5	1949	5	2.5	150

Tunisia	18-Dec-10	Government overthrown in Jan 2011 (Tunisian/ Jasmine Revolution); followed by drafting of a new constitution, democratization and free and democratic elections	8	882	✓	26.9	1959	5	10	124
United Arab Emirates		No significant protests	0	58	✓	53.2	2006	5	2.5	120
Yemen	27-Jan-11	Government overthrown in Feb 2012; followed by Yemeni Crisis	8	1885	✓	6.1	1967	4.05	0	153

[1] Sources: Wolfsfeld (2013); UNESCWA (2016); World Bank (2018).

[2] Not available for labor force participation baseline regression.

[3] Not available for gender norms baseline regression.

[4] Not available for baseline regression of women's right to initiate divorce.