Spring 5-15-2020

The Effect of Sex of Firstborn Children on Attitudes Towards Intimate Partner Violence

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Keywords: Intimate Partner Violence, Attitudes Towards IPV, Gender Preference

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Thesis Submission
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May 2020

Abstract: What are the different ways in which one's life is influenced by the sex of their children? Is there an effect on how they view Intimate Partner Violence? If so, is there a difference in how the male parent is affected by the sex of his child than the female parent? Bodies of conflicting Social Sciences literature suggest having a daughter makes one both more and less likely to engage in Intimate Partner Violence. In this paper, I approach this question through the use of a Linear Probability Fixed-Effects model on Demographic Health Surveys (DHS) datasets, using data from the Men's, Women's and Children's Questionnaires. Results suggest a substantial positive relationship between having a daughter and acceptance of IPV among male respondents, whereas no significant conclusions can be made about the female respondents. When analyzed by groups of countries with similar sex-ratios at birth, I found that the relationship observed for the men only held for respondents in countries with masculine skewed sex-ratios.

1. Introduction

Intimate Partner Violence (IPV) is a highly prevalent issue across cultures world-wide, affecting women of different geographical, social, and economic backgrounds. In 2017, the World Health Organization (WHO) reported that roughly 1 in 3 women who have been in a relationship will experience sexual and/or physical intimate partner violence within their lifetime. While the nature, frequencies, and intensities of IPV occurrences vary, the literature suggests a significant prevalence of IPV across the world, with an overwhelming majority of cases being ones wherein the male partner is the perpetrator and the female partner is the victim.

Often referred to outside academia as simply 'Domestic Violence,' the term IPV is generally used for the purpose of specifically defining the kinds of acts and behaviors fall under this classification. The term 'Domestic Violence,' while typically used to refer to violence perpetrated by the victim's intimate partner, can also encompass abuse by any member of a household, such as child-violence, or elder-abuse. IPV is formally defined as coercive and/or assaultive behaviors that can include acts of physical assault such as kicking, hitting, or beating, as well as coercive sex, and/or psychological attacks of intimidation, humiliation, and belittling perpetrated by the victim's intimate relationship partner, or spouse/partner in union (Garcia-Moreno et al., 2005; Ibrahim et al., 2014; Owoaje & OlaOlarun, 2012).

There exists a giant body of work in the social and medical sciences linking IPV with poor long-term health status, including immediate physical and/or mental health effects such as miscarriages, suicide, fetal injury, depression, and sexually transmitted diseases to name a few (Cools & Kotsdam, 2017; Durevall & Lindskog, 2015; Krishman, 2005; Yount et al., 2011; Boy & Salihu, 2004; Campbell, 2002; Ellsberg et al., 2008; Yount et al., 2015). Additionally, there is evidence suggesting that the psychological distress caused by IPV can cause long-term economic problems, such as a decline in labor participation, decline in labor productivity, and loss of wages – linked both directly and indirectly with negative consequences on children's health and education over time (Centers for Disease Control, 2003).

According to a globally representative survey, 43% of women state that IPV is an acceptable action in different degrees (Anttila-Hughes et. al, 2016). This acceptance of IPV is generally

much higher in poorer countries (Jayachandran, 2014). Despite this commonly-accepted high occurrence of IPV, there are many measurement issues academics and development/social organizations have faced when studying IPV, largely connected to the limitations of self-reported datasets, which often leads to underreporting. Additionally, instances of IPV are also underreported due to social desirability bias i.e. the tendency of people to answer questions (particularly to those perceived to have some authority over them) in a way that they believe would be considered favorable, leading to underreporting of undesirable behaviors. (Sugarman & Hotaling, 1997). This cognitive bias is an especially big problem in studies investigating IPV that use survey data. Attempts to step out of the interview/survey models of data collection include the construction of measures of IPV occurrence via a combination of administrative datasets on police reports and hospitalizations (Aizer, 2010). However, the downwards bias still remains an issue here, mainly because instances of IPV that did not lead to a police report or a formal hospital treatment (such as instances resulting in minor injuries, psychological attacks, or coercive sex) go unreported, and thus, un-accounted for.

Due to these issues surrounding the measurement of occurrence and intensity of IPV, this study will instead focus on measures of attitudes towards intimate partner violence. Many other academic studies have used measures of attitudes over records of instances of IPV because it is believed that there is less social stigma association with discussing one's beliefs about IPV, as opposed to with the acts of admitting to being or having been a victim or perpetrator of IPV. Additionally, attitudes of acceptance towards IPV is one of the strongest indicators and high-risk factors for the prevalence of IPV in both the household and the community levels (Perez et al., 2006; Perez-Jimenez et al., 2017; Orpinas, 1999; Boyle et al. 2009; Bucheli & Rossi, 2017). Although this measurement and variable-choice distinction is an often discussed one, measures of attitudes towards IPV are used less in studies, particularly in Development Economics. IPV researchers acknowledge this gap and call for additional studies to be conducted using measures of IPV specifically gauging the 'attitudes' or 'beliefs' towards IPV. (Krause et al., 2016; Cools & Kotsdam, 2017; PerezJimenez et al., 2017; Yoshikawa et al., 2014). This study is an attempt to further contribute to this body of literature, focusing specifically on the evolution of attitudes towards IPV, exploiting the gender of a couple's first-born child as the exogenous 'effect' with which to analyze how survey-reported attitudes change over time.

Using a Linear-Probability Fixed-Effects model in the five different DHS questions meant to gauge a respondent's attitudes towards IPV, which I describe in detail in the Data Setion below, I found no conclusive evidence of a strong causal relationship between the sex of the firstborn and a female respondent's attitudes towards IPV. However, using the Men's questionnaire, my results show a statistically positive effect, suggesting that a man who has had a daughter in the last 12 months is more likely to answer questions in a way that indicates a higher acceptance of IPV, by about 3.50-4.50 percentage-points. When I ran the analyses separately for each DHS country, I found some evidence, most of them statistically insignificant, suggesting that this relationship may not hold enough across cultures to be generalized in a meaningful way. I reran the analysis, this time using three groups of countries – clustered by high, natural, and low sex-ratios at birth, and I found that the strong positive, statistically significant result was only upheld among countries with masculine-skewed sex-ratios at birth.

The rest of this paper is organized in the following way. Section 2 includes brief discussions on relevant literature, organized separately into sub-sections exploring Social Norms, IPV, Attitudes Towards IPV, Child-Sex Preferences, and Sex-Ratios at Birth. Section 3 contains information and summary statistics on the dataset used in this study. Section 4 contains a discussion of my research design and the construction of the variables used in my model. Section 5 includes a detailed outline of my methodology and the linear-probability fixed-effects model used. Section 6 contains a discussion of my results and suggestions of an underlying mechanism from other literature in the Social Sciences. Section 7 includes a brief discussion of this study's take-aways, main contributions, and some concluding remarks.

2. Literature Review

2.1 Social Norms

In a broader sense, compared to the discussion above, this study contributes to the existing body of research on the topic of Social Norms. Specifically, this study is related to the study of the formation and evolution of social norms, household bargaining dynamics, and the role of violence in society, as both an outcome as well as an aspect directly shaped by existing social norms. There are many studies that have focused on the theoretical make-up and structure of social norms. Perhaps most famously, Peyton Young's 2015 study looked at the evolution of social norms through an interdisciplinary lens – combining theory examples from Economics, Sociology, Political Science, and Demographic Studies – including models of social activity such as bargaining norms, norms governing the terms of contracts, norms of retirement, dueling, foot binding, use of contraceptives, etc. to highlight the challenges faced by academics to apply theory to empirical cases and vice-versa. (Young, 2015) Other well-known social norms theory studies focus on the historical-leadership views on the consequence and social role of expectations (Acemoglu et al, 2014), the 'group beneficial' spreading of norms in a population (Boyd & Richerson, 2002), the internalization and spreading of gender/social norms (Staveren and Ode bode, 2007; Veblen, 1964), intrahousehold bargaining dynamics and resource allocation (Rosenzweig, 1982), and how attitudes and beliefs are transmitted across generations (Bisin and Verdier, 2001). This study is an attempt to submitting a contribution to this vast body of work.

Specifically, this study adds empirical evidence to the theories surrounding social norms specifically from the point of view of measuring and analyzing violence as a social issue. There exists a large body of work focusing on the formation, spreading, evolution, and transmission of violence in and across societies. Veblen and Burda et al, specifically, discuss gender norms and roles as formal institutions within society, and focus on these norms as economic determinants. (Veblen, 1964, Burda et al, 2007). The use of the plough, a historically commonly used agricultural tool in many societies, as a measure of social male preference and the abstract 'patriarchal index' of a society is becoming common in Development Economics today. (Alesina et al, 2013) Additionally to add the long-term negative consequences of IPV from a lens of social norms theory, studies from decades ago

have found evidence suggesting that children observing violence between their parents are more likely to be violent themselves as adults (Kalmuss, 1984).

2.2 Domestic Violence and Bargaining

This study also directly contributes to the fast-growing academic area analyzing IPV and domestic violence against intrahousehold family-level bargaining, at the couple or family level. While this study does not directly observe intra-household dynamics across datasets, all the analyses are presented for both men and women, shedding light on some directional differences in how responses regarding attitudes towards intimate partner violence can differ in a household setting.

Most of the studies in this realm focus on the role of different determinant and consequent aspects of intimate partner violence from a household/family-level perspective. Women with higher levels of education were found to be less accepting of IPV, from both a lens of formally defined years of education, as well as via measures concerning respondents self-confidence, social networks, and professional lives (Jewkes, 2002; Martin et al, 1999; Steinments, 1987). Additionally, discussing the woman's income, in both market and informal non-market income forms, between a couple is considered inappropriate and is correlated with IPV in many societies. (Staveren & Ode bode, 2007). Main models of this issue in Sociology include the 'Women's Wages & Male Backlash' Model (Macmillan & Gartner, 1999), and the 1983 Gelles model, which incorporates classical economic bargaining theory into the causes of domestic violence (Gelles, 1983).

2.3 Attitudes Towards Intimate Partner Violence

There also exists a comparatively small, but fast-growing body of work specifically concerning attitudes towards intimate partner violence specifically. Many of the major studies in this subfield explore the factors that affect these attitudes, such as age, employment, education, and motherhood (Prabhu et al, 2001; Owoaje and OlaOlorun, 2012; Kwagala et al, 2013). Interestingly, perhaps an indications of how underexplored these measures are, there are studies that contradict certain factors determined to be linked with attitudes towards IPV in other studies. As an example, one study found that age does not influence females' IPV acceptance (Bucheli & Rossi, 2017), while another found women to be more accepting of IPV in general compared to men (Speizer, 2010), and yet another study

found that employed women, while less accepting of IPV, in generally face a higher risk of IPV (Cools and Ktsdam, 2017). There have also been some interesting IDEC theses based on attitudes towards IPV, which this study will add to. Krupoff et al, 2018, observed income shocks via changes in algae populations in coastal Indonesian towns, and found attitudes towards IPV change with income shocks. On a similar vein, Lee et al, 2016, found that women's attitudes towards Intimate Partner Violence is directly affected by Climate Variability. Eckenrode et al, 2018, focused on the gendered attitudes towards IPV from a wider lens of social norms and gender roles. One of the findings of the Eckenrode study was that women are, in generally, more accepting of IPV than men – a phenomenon that is observed in my study as well, with surprising consistency across countries and cultures.

2.4 Child-Sex Preference

Given the use of the sex of the first-born child as the exogenous effect variable in determining the change observed in attitudes towards IPV, a discussion on the literature surrounding gender-preference is relevant here. This is a fairly underexplored subfield within Economics, specifically so in Development Economics, where most of the sex preference literature revolves around the Chinese/Indian son-preference issue, and their consequences in long-term population/demography evolution and abortion rates. However, it is worth noting that while they both explore similar spaces with overlapping concepts, the two ideas are fundamentally different, in that sex-ratios and selective-abortion studies examine preferences about child-sex, whereas my study is examining changes in preferences brought on by child-sex.

The sex of a child as an effect variable (from the study's respondent-level perspective) is quite rare in Economics, and features in some very interesting and creative studies. One such study found that having daughters makes people more likely to vote for left-wing political parties (Oswald & Powdthavee, 2010), while another found that conditional on the total number of children, each additional daughter increases a congressperson's propensity to vote liberally on reproductive rights issues. (Washington, 2008) On a similar vein, a more recent study found that, conditional on the total number of children, judges with daughters consistently vote in a more feminist fashion on gender issues than judges with only sons (Glynn & Sen, 2015). In Financial Economics, a 2017 study found that when a firm's CEO has a daughter (as opposed to having no children or only sons), the corporate

social responsibility rating (CSR) is about 9.1% higher, compared to a median firm (Cronqvist & Yu, 2017).

2.5 Firstborn Sex Effects

While underexplored in Economics, and especially so in Development Economics, the effects of the sex of firstborns has been examined in a small, but growing body of literature in the social sciences, especially by Evolutionary Anthropologists and Sociologists. To date, some of the most interesting explorations in this space has been focused on the Indian context, due to its well-known historical son-preference, wide (relative) availability of data and network of international organizations and NGOs doing field work and conducting surveys frequently. (Weitzman, 2019)

Studies suggest that firstborn sex has important implications for many different areas surrounding material well-being, such as measure of marital instability (Bose & South, 2003), postpartum depression (Patel et al, 2002), anemia (Sabarwal et al, 2012) and Intimate Partner Violence. (Milazzo, 2014) In a recent 2019 study, Abigail Weitzman concluded that in states with masculine sex-ratios of first births, firstborn daughters are found to elevate the risk and severity of IPV. She also found that these effects were especially pronounced in cases involving uneducated women. (Weitzman, 2019) To my knowledge, attitudes towards IPV have not been investigated in this context.

2.6 Sex-Ratios At Birth

Finally, one more area that is relevant to my study involves sex-ratios-at-birth. In my final analysis, presented and discussed in detail in Section Six below, I grouped the countries in my dataset into three groups of high, natural, and low sex-ratios at birth. I used the WHO defined threshold to accomplish this. The WHO defines the 'natural' SRB to be between 103 to 107 males born for every females. The literature in this space shows that there are many countries in the world today that have SRBs well over this commonly accepted natural range – with the most commonly cited examples being India, China, an South Korea – the former two of which have been the focus of many studies investigating sex-selection, sex-determination technologies, and selective abortions. (Krause et al. 2019)

Son preferences in these countries have been linked to strong historical patriarchal systems, patrilineal kinship structures, the marginalization of women, inheritance laws, family/lineage continuation customs, marriage customs, social/household norms, economic power imbalances and socio-religious-cultural evolution of son-preference over time. (Das Gupta, et al., 2003; Jayachandran, 2017). This issue has also interestingly been linked with plough-based agriculture techniques. (Alesina, et al., 2018; Krause & Anttila-Hughes, 2016; Jayachandran, 2017). Such phenomena compound together with long-accepted, rigid social norms to result in the systemic underinvestment in girls, which is perhaps best evidenced in India where girl children have a 40%+ high mortality rate than that of boys. (Rosenzweig & Shultz, 1982; Basu & De Jong, 2010; Yamaguchi, 1989)

3. Data

3.1 Demographic and Health Surveys

For this study, I use the Demographic and Health Surveys (DHS) household-level panel data, which is a collection of nationally representative samples of women (generally aged 15-49) and men (generally aged 15-59) in the DHS Women's and DHS Men's datasets respectively. The DHS is a global survey that collects socioeconomic, health, fertility/contraception use, and gender empowerment data for the use of academic analysis, organizational programs and governmental/NGO/INGO policymaking.

I combine information from the basic DHS questionnaires data with the DHS Module-2, containing household characteristics and questions regarding domestic violence/IPV, and attitudes towards IPV. The DHS Module-2 is an optional questionnaire add-on to the basic DHS survey model, and thus, as such, not every country and year has this data available. Combining information from the Women's, Men's, and Children's datasets, I finally arrive at my two main datasets which I am calling the Men's file and the Women's file in this paper. In each file, I have the full information found in DHS Modules 1 and 2 for each respondent, along with information about their children – crucially the firstborn child's sex, age, and month/year of birth – from the Children's dataset. All of my analyses outlined below, and thus all of my results presented below are separately obtained for each file, allowing me to contrast between outcomes observed using the datasets representing male and female respondents in each stage.

Summary statistics and key observations are outlined in the first nine tables. Tables one and two summarize variables age (in years), educational attainment (in single years), employment status (dummy; 1 = employed at the time of survey), and type of place of residence (dummy; rural = 1 and urban = 0) for the full women and men's datasets. All four of these variables represent characteristics that are considered to be causally linked with IPV and attitudes towards IPV in the literature. Specific details and citations are mentioned in the Literature Review section above. In my analysis exploring the effect of the sex of the firstborn child, I will be using these four variables as my control covariates in the linear probability fixed-effects model. More details are in the Methodology section below.

Tables Three and Four summarize the same four variables as Tables One and Two, for the Women's and the Men's files respectively, but with both datasets filtered down to only include respondents who have had a firstborn within 12 months of the survey. Table Five lists all the countries represented in this analysis. Tables Six and Seven list an summarize observation counts and summary statistics for each survey year represented in the Women's and the Men's files respectively.

Finally, Tables Eight and Nine show summary statistics for each of the five dependent variables for the Women's and the Men's datasets respectively. There is also a sixth indicator variable that captures respondents who have answered to at least one and/or more of the IPV attitudes questions with a "yes" in each dataset. I am using the name "IPV Acceptance: Any" in both the summary statistics and results to denote this sixth dependent variable. For more details on how these variables were created, please see the next Section.

Figures One and Two show World Maps indicating the mean-values of the "IPV Acceptance: Any" variable by country. Consistent with the existing literature on attitudes towards IPV, women are seen here to be generally more accepting of IPV than men, at least in the way they answer the questions asked by the DHS program, although there are some exception countries.

3.2 UN World Population Prospects

I also supplemented the DHS Modules 1 & 2 questionnaires with the United Nations World Population Prospects dataset, 2000-2005 to match countries with their sex-ratios-at-birth. I used the commonly accepted World Health Organization threshold of 1.03 to 1.07 Men per Woman guideline in order to subdivide my dataset into three groups of countries with high, natural, and low sex-ratios-at-birth. More details Section 4.4

4. Research Design

4.1 Constructing and Using the Dependent Variables

The five primary dependent variables used in this study are all taken directly from the DHS Module-2 questionnaire (the DHS Domestic-Violence questionnaire). These are five yes or no questions asked to each respondent in the Module-2 datasets for both the Women's and the Men's files. The DHS program confirms that each of the questions are translated across languages, dialects, and cultures as accurately and appropriately as possible. A respondents answer to each of the five questions are meant to measure their attitudes towards IPV in different scenarios and contexts.

Respondents are asked if "A husband is justified in beating his wife if she:"

(i) Burns the food?

(ii) Goes out without telling him?

(iii) Neglects the children?

(iv) Refuses to have sex?

(v) Argues with him?

Answers to each of these questions are coded in the datasets as dummy variables, with observation value 1 corresponding to a respondent replying with a "yes" and observation value -0 corresponding to a respondent replying with a "no." Additionally, I have also constructed a sixth dependent dummy variable that has observation value 1 if the respondent replied to at least one or more of the five IPV attitudes questions with a "yes," and a 0 if they replied to all five questions with a "no."

Tables Eight and Nine show summary statistics for each of the six dependent variables used in this study for the dataset filtered to only include respondents who had a birth within 12 months of the survey.

4.2 Constructing the Independent Variables

Since we are using a linear-probability fixed-effects model, the dependent dummy variables, indicating a value of 1 for a "yes" answer and a value of 0 for a "no" answer to the IPV attitude questions, are used as is to measure "IPV Acceptance" in the results. On the other hand, indicator variables were created in constructing the independent variables. Variables are created to indicate a first child born within 12 months of the survey as a dummy variable and to indicate the sex of the firstborn child. The information in the DHS Children's dataset is used to arrive at these final indicator independent variables.

I do this by first creating a 'recent birth' dummy variable in the Children's dataset, with observational value 1 indicating the child was born within 12-months of the interview date. Since there is no data collected in this questionnaire module for expected children (indicating a future birthdate give by expected date of birth), we are left with value 1 for this variable for each observation either 12-months old or younger at the time of the interview. I then create a second 'first-born' dummy variable, with observational value 1 indicating the observation as representing the first-born child of the family. Each observation with value 1 is then cross-checked against the 'Number of Siblings' variable, and against measure of infant mortality and miscarriage data from Module-1 to ensure that the observation is, in fact, the first-born child in the household. I then, an create another dummy variable for 'recent firstborn,' using the two variables described above, and finally a 'male' and a 'female' dummy variable for each observation corresponding to the gender of the first-born. I then collapse the observations to the mother's level, given by the 'Woman ID' in the dataset, so that I have observations on recent first-births (if there was one) and their child's gender dummies for each woman. I then merge this dataset, collapsed to the mother's level with the recent first-births (and child's gender) identifying dummy variables with the DHS Women's Survey dataset by the 'Women ID' respondent identification variable for each survey/year. This process leaves me with one DHS dataset with observations and information at the level of the Women's dataset with dummy variables identifying if the woman recently had a child, if the child was the first-born in the family, and the gender of the child. This equips the dataset to run the analysis discussed below.

4.3 Exogeneity

The decision to use the 12-months within the survey as a qualifier for a 'recent' firstborn is an identification strategy. Literature suggests that sex-selection technologies use and practices such a selective abortion procedures are generally very rarely carried out for the first child in a household unless the family is mandated to have only one child. None of the countries or geographic regions used in this analysis includes an area with such a law. Additionally, I have limited the analysis to only include couples who had their firstborns recently in order to capture the immediate effect of the sex of the child on attitudes towards IPV. Even though we are using control covariates for the main characteristics that are causally linked with attitudes towards IPV in the literature, in addition to fixed-effects at both the geographical (DHS administrative region) and time (survey-year) levels, allowing for a long time to pass after the birth-month of the child and the survey month opens the doors to many other changes in the respondents lives which could impact their answers to the IPV attitudes questions. For this reason, I have limited the main analysis to only include respondents with children just or under one year of age. Given this identification strategy in constructing the main independent variable, along with the exogenous natural sex selection of the child, I believe the independent variable used in the main model is plausibly exogenous. I describe the specifics of the model itself in more detail in the next section.

5. Methodology

In order to estimate the effect of the gender of a couple's recently first-born child on their attitudes towards Intimate Partner Violence, I use a Linear Probability Fixed-Effects model with the following specifications:

For respondents who have had a firstborn within 12-months of the survey:

$$Viol_{idy} = \beta_0 + \beta_1.FemaleFirstBorn_{idy} + \mathbf{B} \,.\, X + \delta_d + \theta_y + \mu_{idy}$$

Here,

- $Viol_{idy}$ is a dummy variable indicating IPV acceptance (1 indicates violence justified)
- $FemaleFirstBorn_{idy}$ is a dummy variable indicating the sex of the recent firstborn
- X represents the vector of controls including age, years of education, employment, and type of place of residence (Rural vs Urban)
- The δ and the θ represent the time-invariant characteristics, given here by administrative-region and survey-year fixed effects.

Here, my parameter of interest is represented by the coefficient β_1, which captures the effect of the recent firstborn being female, as opposed to male, on attitudes towards IPV measured by the answers to each of the five dependent variable questions outlined in section 4.1 above. Covariates include measures of age, years of education, employment status, and type of place of residence (Rural vs Urban).

Additionally, administrative-region and survey-year fixed effects are used here in order to control for the time-invariant characteristics that may bias the effect of the treatment variable, the sex of the first-born, on attitudes towards domestic violence at the geographic (DHS administrative region) and time (survey year) levels.

6. Results

6.1 Results for the full-samples

The first round of results I will present here are for the full Women's and Men's files, with the samples filtered to include only respondents who have had a first childbirth within 12 months of the survey month.

Table Ten shows the regression results for the main linear probability analysis for the Women's file. Our primary estimate of interest, the coefficient on the independent dummy variable indicating a female firstborn child, is very close to zero and does not have statistical significance at the 10% level. While our estimates are consistent in direction, given the weak magnitude of the coefficients, I do not believe anything should be concluded regarding the direction of the effect, especially considering the different directions observed in the following section analyses. Our estimates for each of the control variables are consistent in both direction and significance with what we would expect, given the literature on attitudes towards IPV, discussed in detail in Section Two above.

Table Eleven shows the regression results for the linear probability analysis for the Men's file. In this case, unlike the Women's file, we do see a clear signal in our estimate of interest. We see a positive effect of about 3.5-4.5 percentage points in a positive direction, suggesting that men who have had a daughter are more likely to be more accepting of IPV than men who have had a son as their recently born first child. The estimates are significant at the 5% level. Once again, our control variables have estimates in the expected direction and significance, just as with the women's file results.

Table Twelve contrasts the estimates, observation counts, and regression output for both the Women's and Men's file.

6.2 Results by Dependent Variable Questions

Results for both Women's and Men's files estimates on each of the coefficients on the female firstborn indicator variable are tabulated by dependent variable question in Table Thirteen. Figure Three shows these estimates in a bar-graph.

The strong signal observed for the full dataset in the Men's file seems to be driven, at least in terms of statistical significance, by mostly the answers to the three IPV attitudes questions referencing the wife going out with permission, neglecting the children, and refusing sex. Interestingly, all five of the questions have strongly positive effect well-above 0, suggesting that men do become more accepting of IPV if they have a daughter as opposed to a son as their firstborn children.

The women's result is more varied. Four out of the five estimates lack statistical significance, and the one that is significant at the 10% level is weakly negative. However, the results are directionally interesting as four out of the five questions (including the lone significant estimate on the question referencing the wife burning the food) are negative, which suggests that women become less accepting of IPV if they have recently given birth to a female firstborn, as opposed to a male firstborn. Still, given the weak estimates magnitude and significance, the results are not conclusive for the women's file.

6.3 Results by Country

The next round of results I have obtained are for each country, using again our "IPV Acceptance: Ever" variable as the dependent variable, and with our main model with fixed-effects at the DHS administrative level and the survey-year level. Figures Four and Five plot two World Maps, wherein the observed estimate for each country is plotted as a color in a spectrum for the Women's and the Men's files respectively.

There were 21 country sub-samples excluded from the Women's file in running the regressions by country due to insufficient observations, leaving 57 countries included finally.

Testing at the 1%, 5%, and the 10% levels, there were five country sub-samples that showed statistical significance.

Congo: + 0.103 **
Nigeria: + 0.0356 **
Egypt: - 0.05 ***
Namibia: - 0.0375 **
Senegal: - 0.0639 *

The first thing one likely notices when glancing at these maps together is how the colors are bolder on the Men's file results, irrespective of whether the coefficient suggests a positive or negative estimate direction. The significant estimates obtained using the Women's file data also suggests a weak estimate. Congo is an exception, as here, we see a very strong positive effect by just over 10 percentage points. Two of the country sub-samples showed a positive effect while three showed a negative effect.

On the flipside, we can observe bolder colors on the maps on the Men's file estimates, which suggests that men are stronger have a stronger child-sex effect on their attitudes towards IPV, whether it is on the positive or negative direction. A total of 49 countries are included in the country sub-sample level analyses, after 9 countries dropped out due to insufficient observations. The follow four countries showed statistical significance.

Guatemala: + 0.0154 *
Pakistan: + 0.0794 **
Rwanda: + 0.0768 **
Timor-Leste: - 0.0287 *

Consistent with our main result, three of the four significant estimate yielding sub-samples show a positive effect, indicating that men tend to become more accepting of IPV if their first-child is a daughter. However, a third, weak estimate shows a negative direction. Additionally, significance aside, glancing at the World Map plotting each country's estimate is also directionally interesting, as we see a mix of positive and negative effects. In order to dive deeper into understanding this phenomenon, the final analysis I carried involves dividing

countries into groups of high, natural, and low sex-ratios at birth and using those as sub-samples.

6.4 Results by High, Natural, and Low Sex-Ratio-At-Birth Country Groups

Sex-ratios at birth for the countries were obtained using the UN World Population Prospects (2000-2005) datasets. Using the natural sex-ratio-at-birth threshold, coined by the World Health Organization (WHO) as having between 1.03 to 1.07 men per woman, the countries were dividing into groups of natural, high (<1.03 men/woman) and low (>1.07 men/woman) groups. Table Fourteen shows the breakdown of the three groups with the full country lists for each, and Table Fifteen shows estimates obtained for each group on our parameter of interest.

Using the three country groups divided by sex-ratios-at-birth on both the Women's and the Men's file, I found only one subsample with statistical significance, as the estimate obtained using the Men's data on the high SRB countries (in other words, a masculine-skewed sex-ratio at birth) showed a strong positive signal at the 5% level. The coefficient suggests an almost +6% percentage point increase in the acceptance of IPV as an effect of the firstborn child being a girl. All other sub-samples, the different SRB-country-groups and both the Women's and the Men's files yielded weak and statistically insignificant estimates.

This result, along with our country-level analysis described in the section above puts our main result into some perspective. While we found a strong positive effect for the full Men's file sample, the estimate did not seem to hold when the file was analyzed by country. This final revelation suggests that it was the high-SRB countries driving this effect. The same three IPV attitudes questions as mentioned in Section 4.2 above were driving this result as well. On the Women's file, none of the dependent variable questions yielded a statistically significant result, including the 'Burns the Food' question that did show a negative effect significant at the 10% level, did not hold when the countries were broken down by sex-ratios-at-birth. Additionally, across all levels of analyses, the four control covariates used were found to be strongly linked with attitudes towards IPV in the predictable direction and magnitude, given by the literature in the field. (Prabhu et al, 2001; Owoaje and OlaOlorun, 2012; Kwagala et al, 2013)

7. Conclusion

Overall, this study found a strong, statistically significant effect suggesting an increase in likelihood of IPV acceptance among men if their recently born firstborn was a daughter. This result seemed to be driven mostly by the answers to the question referencing the wife going out without permission, neglecting the children, and refusing sex. When analyzed by country, this effect was seen very strongly and almost exclusively in high sex-ratios-at-birth countries, where sex-ratios are masculine-skewed. As mentioned in the Literature Review section above, this result disagrees with the familiarity effects one might expect to observe given the theoretical and empirical work done exploring social norms and familiarity. However, one possible mechanism suggestion comes from other Social Sciences (especially evolutionary anthropology) where academics have been studying men growing resentful, and thus more violent, towards their lives for giving birth to girls in countries were son-preference is strong. Some of the major studies exploring this phenomenon are discussed in Section Two above.

To my knowledge, this is the first study to uncover this phenomenon at a global scale using datasets with multiple countries and survey-year time periods. Most of the research in this space seem to be smaller in scale, and singularly focused on one country/socio-economic context at a time. I also believe that my result opens the door for more research in the future, as the mechanism still warrants exploring, perhaps with qualitative survey/interview data used to complement the quantitative analyses with suggestions of mechanisms at work.

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Figure One:

Women's File: IPV Acceptance by Country

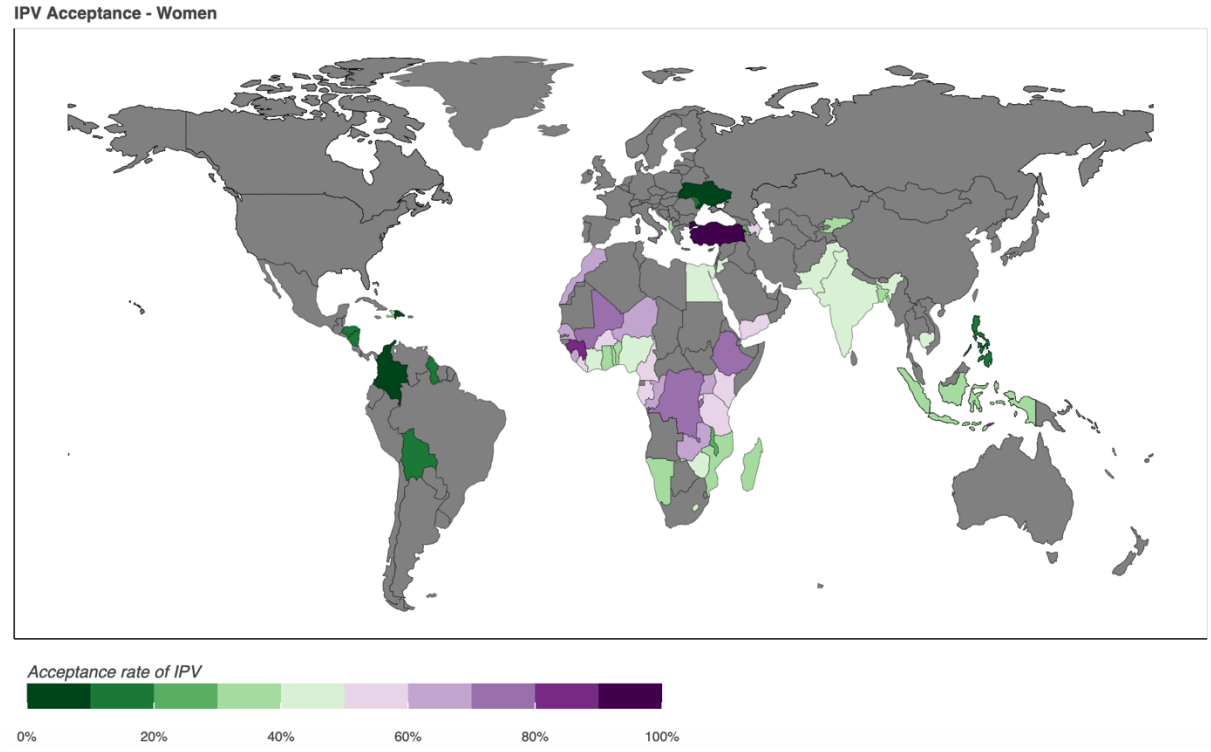

Figure Two:

Men's File: IPV Acceptance by Country

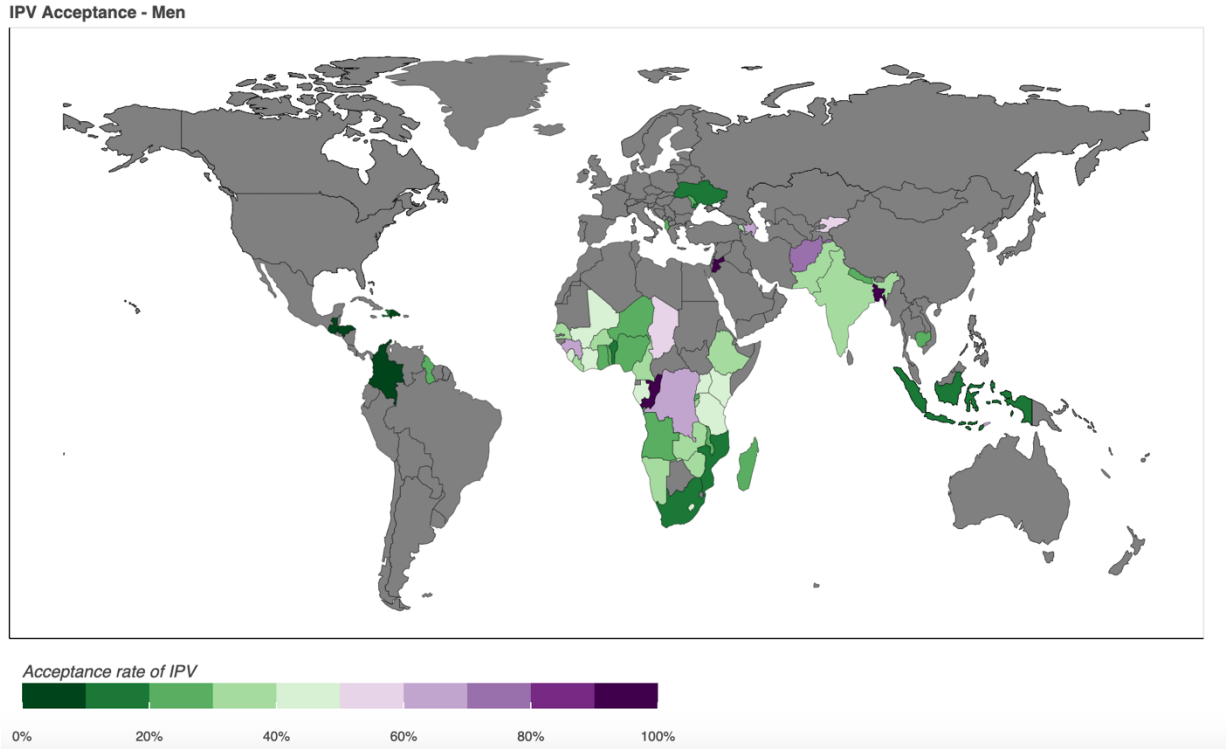

Figure Three:

Estimates by Dependent Variables (IPV Attitudes Questions)

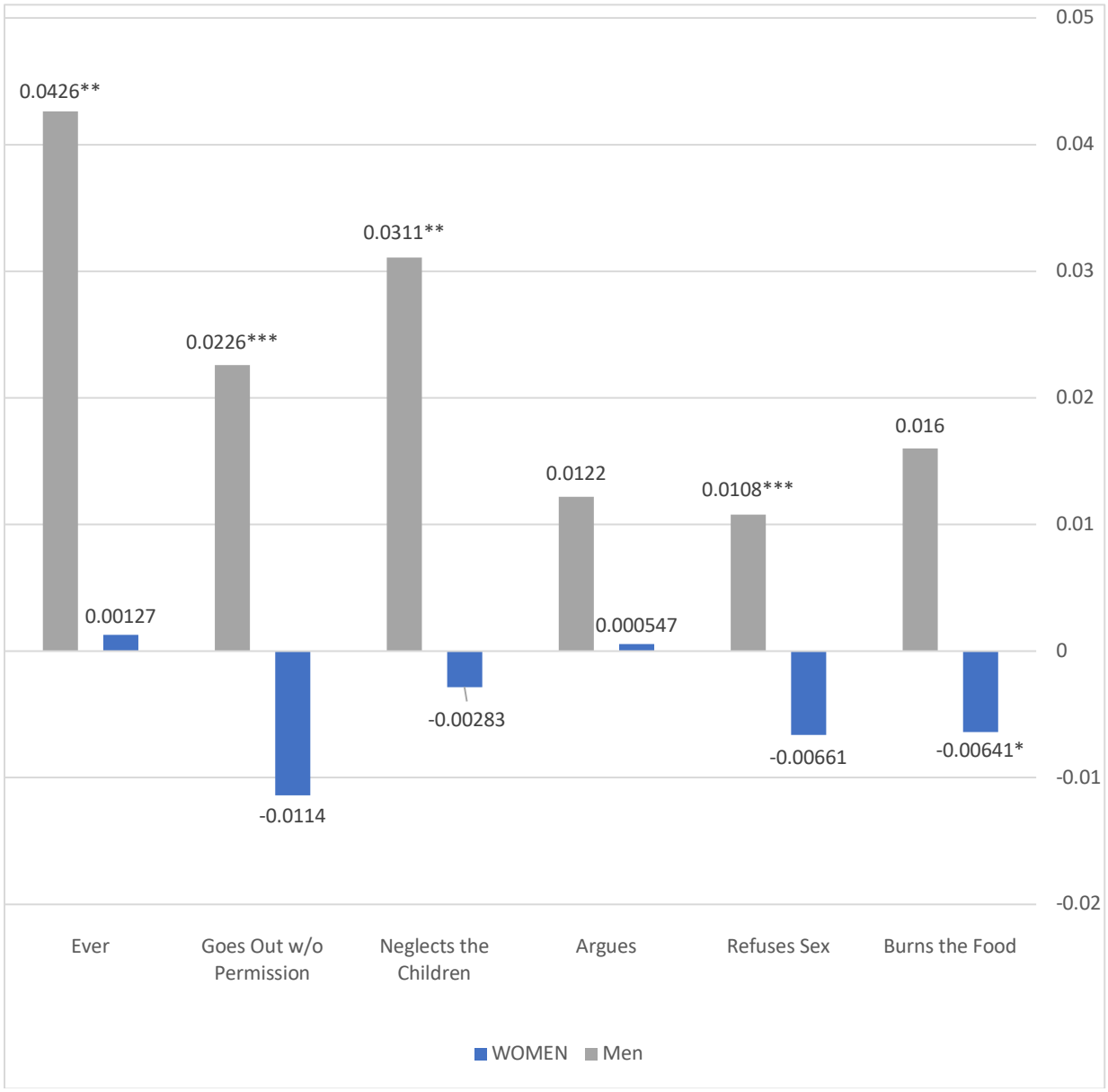

Figure Four:

Women's File: Estimates by Country

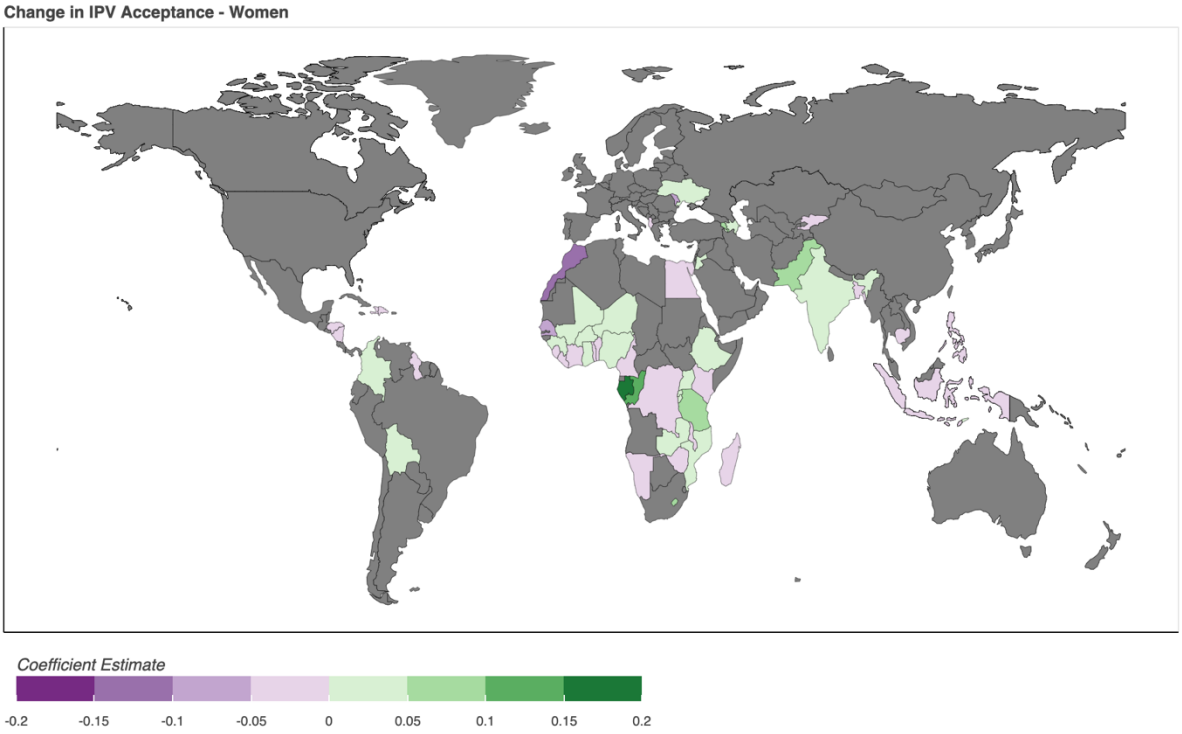

Figure Five:

Men's File: Estimates by Country

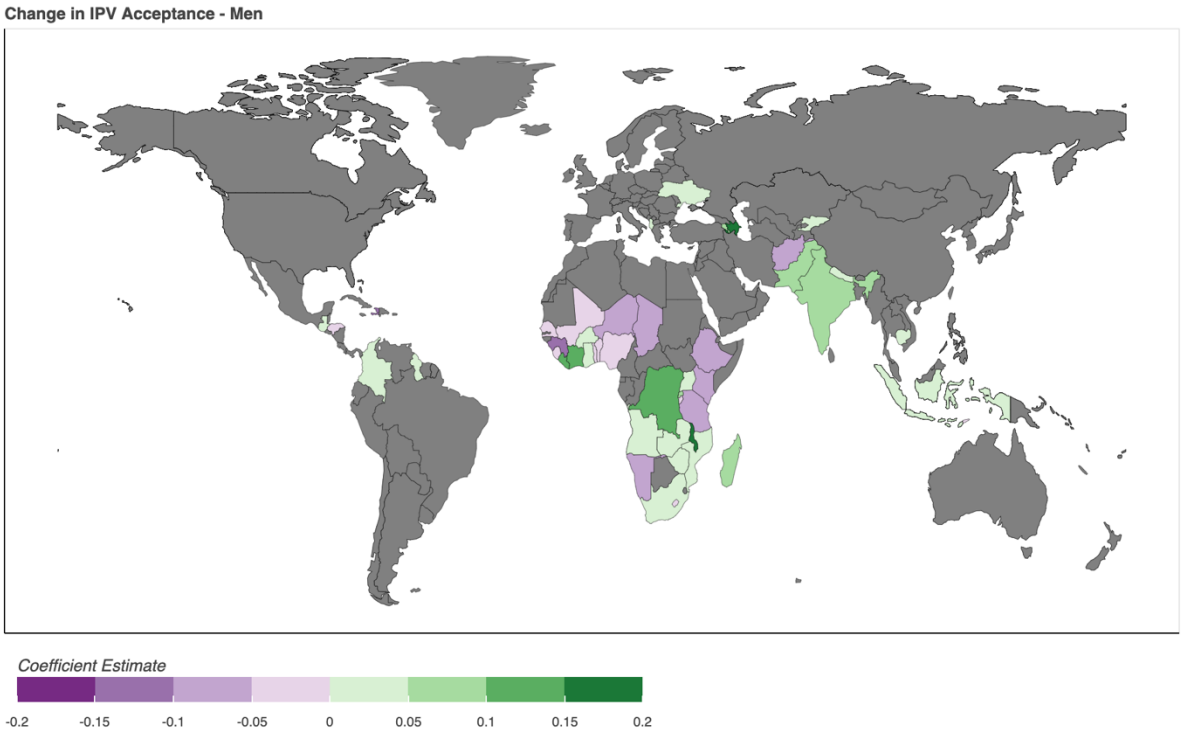

Table One:

Women's File: Summary Statistics for the Whole Dataset

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Age	2820000	29.959	9.6	10	65
Education (In Single Years)	2790000	5.577	4.799	0	20
Employment Status (1 = Employed)	2630000	.388	.487	0	1
Rural Residential Type (vs Urban)	2820000	.572	.495	0	1

Table Two:

Men's File: Summary Statistics for the Whole Dataset

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Age	927000	31.544	11.718	13	64
Education (In Single Years)	927000	7.183	4.754	0	20
Employment (1 = Employed)	876000	.794	.471	0	9
Rural Residence (vs Urban)	927000	1.595	.491	1	2

Table Three:

Women's File: Summary Statistics for the Respondents who have given birth to their firstborn child in the last 12 months (of survey)

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Age	105000	21.721	4.23	13	50
Education (In Single Years)	104000	6.389	4.774	0	20
Employment (1 = Employed)	96741	.301	.459	0	1
Rural Residence (vs Urban)	105000	.596	.491	0	1

Table Four:

Men's File: Summary Statistics for the Respondents who had a birth of their firstborn child in the last 12 months (of survey)

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Age	31539	27.065	5.329	15	59
Education (In Single Years)	31539	7.975	4.819	0	20
Employment (1 = Employed)	31539	.918	.317	0	9
Rural Residence (vs Urban)	31539	1.61	.488	1	2

Table Five:

Countries Represented

	Frequency
Albania	7584
Armenia	18907
Azerbaijan	8429
Bangladesh	46676
Benin	40577
Bolivia	34579
BurkinaFaso	29544
Burundi	9385
Cambodia	40491
Cameroon	26049
Colombia	53521
Comoros	5299
CongoBrazzaville	17865
CongoDRC	28753
CotedIvoire	10051
DominicanRepublic	59877
Egypt	57697
Ethiopia	45931
Gabon	8411
Ghana	19975
Guinea	17091
Guyana	4976
Haiti	20879
Honduras	42701
India	124346
Indonesia	107815
Jordan	28232
Kenya	31357
KyrgyzRepublic	8206
Lesotho	14701
Liberia	16283
Madagascar	25295
Malawi	47923
Maldives	7024
Mali	37773
Moldova	7436
Morocco	16771
Mozambique	26150
Namibia	19804
Nicaragua	9778
Niger	20343
Nigeria	79756
Pakistan	13536
Philippines	43375
Rwanda	35391
SaoTomePrincipe	2608
Senegal	30278
SierraLeone	23915
Swaziland	4982
Tanzania	20464

TimorLeste	13136
Togo	9473
Turkey	3158
Uganda	24436
Ukraine	6821
Zambia	31170
Zimbabwe	23972

Table Six:

Women's File: DHS Survey Years Represented

(including only respondents who have had a firstborn within 12 months of the survey)

Tabulation of survey_year

Year Survey Ended	Freq.	Percent	Cum.
1985	206	0.20	0.20
1986	1329	1.26	1.46
1987	2313	2.20	3.66
1988	627	0.60	4.26
1989	734	0.70	4.96
1990	1485	1.41	6.37
1991	1816	1.73	8.10
1992	3409	3.24	11.34
1993	5536	5.27	16.61
1994	2277	2.17	18.77
1995	2278	2.17	20.94
1996	3252	3.09	24.03
1997	3607	3.43	27.47
1998	3281	3.12	30.59
1999	5022	4.78	35.37
2000	5321	5.06	40.43
2001	1534	1.46	41.89
2002	1528	1.45	43.34
2003	4266	4.06	47.40
2004	2708	2.58	49.98
2005	5219	4.97	54.94
2006	8373	7.97	62.91
2007	5571	5.30	68.21
2008	3620	3.44	71.65
2009	3240	3.08	74.73
2010	5436	5.17	79.91
2011	4390	4.18	84.08
2012	5805	5.52	89.61
2013	5417	5.15	94.76
2014	5509	5.24	100.00

Table Seven:

Men's File: DHS Survey Years Represented

(including only respondents who have had a firstborn within 12 months of the survey)

Tabulation of survey_year

	Freq.	Percent	Cum.
2003	515	1.63	1.63
2005	645	2.05	3.68
2006	3594	11.40	15.07
2007	799	2.53	17.61
2008	1709	5.42	23.03
2009	991	3.14	26.17
2010	2091	6.63	32.80
2011	1071	3.40	36.19
2012	2069	6.56	42.75
2013	2392	7.58	50.34
2014	1926	6.11	56.44
2015	6009	19.05	75.50
2016	3967	12.58	88.08
2017	1789	5.67	93.75
2018	1957	6.21	99.95
2019	15	0.05	100.00

Table Eight:

Women's File: Summary Statistics of Dependent Variables

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
IPV Acceptance: Any	58002	.439	.496	0	1
IPV Acceptance: If the Wife Burns the Food	56832	.146	.353	0	1
IPV Acceptance: If the Wife Goes Out Without Permission	57874	.295	.456	0	1
IPV Acceptance: If the Wife Neglects the Children	58170	.33	.47	0	1
IPV Acceptance: If the Wife Refuses Sex	56935	.192	.394	0	1
IPV Acceptance: If the Wife Argues with the Husband	57400	.248	.432	0	1

Table Nine:

Men's File: Summary Statistics of Dependent Variables

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
IPV Acceptance: Any	30718	.307	.461	0	1
IPV Acceptance: If the Wife Burns the Food	30951	.071	.257	0	1
IPV Acceptance: If the Wife Goes Out Without Permission	31065	.172	.377	0	1
IPV Acceptance: If the Wife Neglects the Children	31065	.202	.402	0	1
IPV Acceptance: If the Wife Refuses Sex	30858	.084	.278	0	1
IPV Acceptance: If the Wife Argues with the Husband	30836	.171	.376	0	1

Table Ten:

Women's File: Main Results

Variables	IPV Acceptance				
Female Recent Firstborn	0.00185	0.000793	0.00108	0.00109	0.00127
	(0.00825)	(0.00845)	(0.00803)	(0.00805)	(0.00800)
Age		-0.0124***	-0.00559***	-0.00566***	-0.00493***
		(0.000823)	(0.000797)	(0.000795)	(0.000948)
Education (Single Years)			-0.0205***	-0.0204***	-0.0188***
			(0.00107)	(0.00108)	(0.00122)
Employment Status				0.00635	0.00156
				(0.00989)	(0.00939)
Rural Residence					0.0607***
					(0.0110)
Constant	0.463***	0.736***	0.723***	0.723***	0.658***
	(0.00395)	(0.0195)	(0.0228)	(0.0231)	(0.0326)
Observations	57,991	57,991	57,163	57,163	57,163
R-Squared	0.168	0.177	0.203	0.204	0.206

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Table Eleven:

Men's File: Main Results

Variables	IPV Acceptance				
Female Recent Firstborn	0.0429**	0.0411**	0.0393**	0.039**	0.042**
	(0.0186)	(0.0167)	(0.0147)	(0.0150)	(0.017)
Age		- 0.0099***	-0.0072**	-0.0070**	-0.0059**
		(0.00313)	(0.00279)	(0.00276)	(0.00252)
Education (single years)			-0.015***	-0.016***	-0.014***
			(0.00190)	(-0.00194)	(0.00199)
Employment Status				- 0.054***	-0.049***
				(0.0184)	(0.0165)
Rural Residence					0.090***
					(0.0187)
Constant	0.315***	0.588***	0.642***	0.68***	0.49***
	(0.00905)	(0.0833)	(0.0745)	(0.0826)	(0.0472)
Observations	30,017	30,017	30,017	29,998	29,998
R-squared	0.122	0.132	0.152	0.153	0.159

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Table Twelve:

Women's + Men's File: Combined Results

DHS Women's Questionnaire		
Variables	**IPV Acceptance**	**IPV Acceptance**
Female Recent Firstborn Effect	0.00185 (0.00825)	0.00127 (0.00800)
Using Controls?	NO	YES
Constant	0.463*** (0.00395)	0.658*** (0.0326)
Observations	57,991	57,163
R-Squared	0.168	0.206

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

DHS Men's Questionnaire		
Variables	**IPV Acceptance**	**IPV Acceptance**
Female Recent Firstborn Effect	0.0429** (0.0186)	0.0426** (0.017)
Using Controls?	NO	YES
Constant	0.315*** (0.00905)	0.493*** (0.0472)
Observations	30,017	29,998
R-Squared	0.122	0.159

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Table Thirteen:

Women's + Men's File: Results by Dependent Variable Questions

Variable	Women's Questionnaire		Men's Questionnaire	
	Female Firstborn Estimate	Female Firstborn Estimate [w/ Controls]	Female Firstborn Estimate	Female Firstborn Estimate [w/ Controls]
IPV Justified: If the wife burns the food	-0.00620 (0.00366)	-0.00641* (0.00354)	0.0168 (0.0142)	0.0160 (0.0135)
IPV Justified: If the wife refuses sex	-0.00646 (0.00530)	-0.00661 (0.00546)	0.0106*** (0.00345)	0.0108*** (0.00346)
IPV Justified: If the wife argues	0.00117 (0.00681)	0.000547 (0.00673)	0.0123 (0.00723)	0.0122 (0.00735)
IPV Justified: If the wife neglects the children	-0.00232 (0.00607)	-0.00283 (0.00610)	0.0309** (0.0115)	0.0311** (0.0112)
IPV Justified: If the wife goes out w/o Permission	-0.0107 (0.0112)	-0.0114 (0.0115)	0.0224*** (0.00710)	0.0226*** (0.00699)
IPV Justified: Any one or more answered yes	0.00185 (0.00825)	0.00127 (0.00800)	0.0429** (0.0186)	0.0426** (0.0170)

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Table Fourteen:

Women's + Men's File: Low and High Sex-Ratios-At-Birth Groups by Country

Low SRB **<1.03** **Men/Woman**	**High SRB** **>1.07** **Men/Woman**	**Natural SRB** **1.03 – 1.07** **Men/Woman**
Angola	Albania	**Remaining**
Swaziland	Armenia	**42 Countries** **Total**
Equatorial Guinea	Azerbaijan	
Guinea	India	
Gabon	Lesotho	
Kenya	Madagascar	
Mozambique	Malawi	
Tanzania	Nepal	
Myanmar	Pakistan	
Rwanda	Samoa	
Sao Tome and Principe	Tunisia	
Sierra Leone	**11 Countries** **Total**	
Togo		
Uganda		
South Africa		
Zimbabwe		
16 Countries **Total**		

Table Fifteen:

Women's + Men's File: Results by SRB-related Country Groups

Natural SRB Countries		
	Women's Questionnaire	**Men's Questionnaire**
Estimate Without Controls	-0.00596	0.000570
Estimate With Controls	-0.00486	0.00200

Low SRB Countries		
	Women's Questionnaire	**Men's Questionnaire**
Estimate Without Controls	0.0155	0.000602
Estimate With Controls	0.0131	0.00102

High SRB Countries		
	Women's Questionnaire	**Men's Questionnaire**
Estimate Without Controls	0.0173	0.0596**
Estimate With Controls	0.0167	0.0590**

Using DHS Administrative Region and Survey-Year Fixed Effects
Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**