

Her Job, her Safety? Domestic Violence and Women's Economic Empowerment: Evidence from Ethiopia*

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Abstract

Domestic violence against women is a pervasive public health problem in all countries regardless of cultural, economic, and political background. Yet, the prevalence of domestic violence is very high in Sub-Saharan Africa. In this paper, I examine the effect of women's employment on domestic violence using the Demographic and Health Survey in Ethiopia. To address the endogeneity of women's employment decisions due to reverse causality, the study employs an Instrumental Variables approach by exploiting exogenous geographical variation of women's employment rate at the community level. Moreover, the estimation accounts for the characteristics of socioeconomic and climate variations at the community level using external geospatial satellite information. After accounting for the endogeneity issue, the estimation result shows that women's employment significantly reduces the risk of domestic violence. This result holds robust across different dimensions of domestic violence such as physical, sexual, and emotional violence, and for urban and rural places of residence.

Keywords: Domestic violence, women employment, IV estimations, Ethiopia.

JEL Codes: J12, J16, J21

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1 Introduction

“The prevalence of violence against women and girls is culturally and traditionally entrenched in society and led to the vulnerability of women and girls.” H.E. Ms. Fozia Amin (2021)

Domestic violence against women is a human rights violation and a pervasive public health problem worldwide. Globally, 30 percent of women aged 15 and above have been subject to physical, sexual, or both kinds of violence by their intimate partner¹(WHO,2014). However, the prevalence of domestic violence is very high in sub-Saharan Africa (Devries et al.,2013). Ethiopia has the highest prevalence of domestic violence. Garcia-Moreno et al.(2005) show that women who had ever suffered sexual violence ranged from 6 percent to 59 percent in Japan and the rural part of Ethiopia. There is well-documented evidence that domestic violence can result in substantial public health and economic costs, leading to mental health problems, the inability to participate in the labor market, and lower productivity (Gibson-Davis et al., 2005)². Intimate partner violence is, therefore, not only a human rights violation but a barrier to development, particularly in sub-Saharan Africa.

This paper investigates one of the most promising economic interventions against domestic violence: women’s economic empowerment, as captured by their employment status. More precisely, the study examines the effect of women’s employment on the risk of domestic violence using the Ethiopia Demographic and Health Survey (EDHS). This paper treats female employment status as an endogenous variable due to reverse causality and omitted variables bias. An instrumental variables approach is employed to establish a causal relationship between women’s employment and domestic violence, leveraging exogenous variation of women’s employment rate at the community level. Moreover, it is recognized that risk factors for domestic violence extend beyond the characteristics of women and their partners. Therefore, micro-level data is merged with external geospatial

¹The term domestic violence and intimate partner violence interchangeably used in this paper

²Domestic violence against women also has an adverse impact on the well-being of children (Rawlings and Siddique 2018)

satellite information to account for socioeconomic and climate variations at the community level. Furthermore, separate estimations are provided for urban and rural areas, as well as different forms of domestic violence (physical, sexual, and emotional), to account for heterogeneous effects.

The estimation results suggest that female employment significantly decreases the intensity of domestic violence by 15 percentage points after accounting for the endogeneity issue. This finding supports the household bargaining theory that argues female economic empowerment enhances their bargaining power within the household and mitigates intimate domestic violence. This main finding holds across various dimensions of domestic violence. Specifically, engaging in paid employment leads to an 18 percentage points reduction in the intensity of physical violence. The regression confirms a similar pattern of results for sexual and emotional violence. Women's employment exerts a negative and significant impact on domestic violence in both urban and rural areas.

The results also reveal that the husband's alcohol consumption, witnessing parental domestic violence, distance to the nearest major city, and the woman's age positively and significantly impact domestic violence. Conversely, the husband's education, women's media exposure, and a non-arranged marriage exhibit negative and significant impacts on domestic violence.

Economic empowerment of women through employment contributes to reducing income inequality and improves the well-being of families ([Amartya Sen, 1999](#); [Duflo, 2012](#)). Moreover, Women's earnings can reduce poverty through higher consumption, and expenditure and boost economic growth ([Morrison et al., 2007](#)). It is, however, unclear how women's economic empowerment reduces domestic violence. The household bargaining model argues that women's economic empowerment, particularly women's employment opportunities, increases their bargaining power within the household and reduces domestic violence ([Tauchen et al,1991](#); [Farmer and Tiefenthaler,1997](#)). The empirical evidence in the developed country supports this notion that female economic empowerment leads to a lower risk of domestic violence ([Aizer,2010](#)).

By contrast, male backlash theory predicts that female economic empowerment

should increase the risk of domestic violence as women's economic independence through employment or other financial resources challenges the traditional gender role in the household (Macmillan and Gartner, 1991). The evidence from developing countries, including sub-Saharan Africa, supports this positive correlation between women's employment and domestic violence (Cools and Kotsadam, 2017; Tandrayen-Ragoobur, 2020). These mixed empirical results across different country contexts call for further empirical investigation.

Generally speaking, the economic literature on domestic violence is recent and scant. The present study fills the research gap by examining the impact of women's economic empowerment on domestic violence. I aim to contribute to a growing literature on the determinants of domestic violence by providing empirical evidence for Ethiopia. Recent studies find that women's share of wealth (Oduro et al., 2015), labor income (Iregui-Bohrquez et al., 2019), and women's education attainment level (Weitzman, 2018) are associated with the experience of domestic violence.

For Ethiopia, despite high prevalence of domestic violence, there was a lack of data about the incidence of domestic violence until 2016, which still impedes a complete understanding of the topic. Using the Ethiopian Demographic and Health Survey, Chernet & Cherie (2020) and Tiruye et al., (2020) find personal characteristics such as being poor, education, age, partner alcohol consumption, witnessing family violence, and community acceptance of wife-beating attitudes are the main determinants of domestic violence against women. The current paper complements the prior research by examining the relationship between women's economic empowerment and domestic violence.

This paper also speaks to studies on domestic violence by offering causal evidence on the effect of women's employment on domestic violence based on the IV approach. Existing empirical studies have provided mixed results. Bhattacharya et al. (2011) find female employment has a negative causal effect on the risk of domestic violence, consistent with household bargaining theory. Other studies (e.g., Atkinson et al., 2005; Tandrayen-Ragoobur, 2020) show that female employment leads to a higher risk of domestic violence.

Using firm-level data, Kotsadam and Villanger (2022) provide the first empirical evidence on the link between women's employment and domestic violence for Ethiopia.

Employing a field experiment approach, the authors find that a job offer significantly reduces emotional violence but does not affect physical and sexual violence. In this paper, I provide a comprehensive analysis using nationally representative data considering a large set of individual, household, and community-level characteristics. This paper is one of the first empirical evidence of the effect of women’s employment on domestic violence based on IV estimation for Ethiopia.

The remaining part of the paper is structured as follows: In section 2, I discuss the theoretical predictions of women’s employment and domestic violence, mainly the bargaining model incorporating violence. In section 3, I review the prior empirical literature on domestic violence and women’s employment. Section 4 describes the source of data used in this paper and the empirical strategy. In section 5, I present the descriptive statistics and empirical results. Section 6 presents the estimation result, and section 7 concludes.

2 Theories of Domestic Violence

2.1 Household Bargaining Theory

Household bargaining theory argues that the economic participation of women outside the household increases their bargaining power, which in turn can lower intimate partner violence. The economic role of women outside the household improves their ability to exert change agency, which improves their well-being both within the household and broader society ([Amartya Sen, 1999](#)). Female labor force participation can also boost self-esteem and confidence, making women less tolerant of abusive behavior. Also, women may establish social connections and support systems through their workplace that provide a buffer against violence in the household.

Although domestic violence results from a power struggle between intimate partners in which each partner seeks to maximize utility and bargain power, household bargaining theories do not generally incorporate domestic violence ([Tauchen et al,1991](#); [Farmer and](#)

Tiefenthaler, 1997). Tauchen et al. (1991) developed a bargaining model of domestic violence and predicted that an increase in men's income increases violence and distribution of welfare towards wives. In contrast, increases in wife income decrease violence. Similarly, Farmer and Tiefenthaler (1997) present noncooperative bargaining models of domestic violence in which utility is a function of consumption and violence that the utility for men increases with violence and for women decreases with violence.

Moreover, female economic empowerment can improve women's outside options, such as the possibility of leaving an abusive relationship (Vyas and Watts, 2009) as they do not depend on the financial resources of their husbands. Women's economic opportunity can also contribute to household income and reduce spouse violence by decreasing economic stress. Similarly, Gelles (1997) shows that household economic condition triggers a husband to become violent due to stress and frustration. Thus, female employment reduces domestic violence by husbands. The exposure theory also argues that working women have a lower risk of domestic violence than nonworking women because they spend less time with their partner at home (Chin, 2012).

2.2 Male Backlash Theory

Male Backlash theory predicts domestic violence responds to changing gender roles and power dynamics within marital relationships. As partners attempt to assert power and control over their wives, working women are more likely to experience intimate partner violence than nonworking women (Macmillan and Gartner, 1999). In traditional society, where women have limited outside options, the husband has the responsibility of providing financial resources for the household as the breadwinner. Wives are responsible for home production, such as caring for children, cleaning, and preparing food. Thus, the wife's economic independence signifies a challenge to socially and culturally prescribed male dominance and female dependence norms, triggering a male backlash.

Similarly, Akerlof and Kranton (2000) developed an economic model of gender identity. As they point out, identity is a person's sense of belonging to specific social categories

and how people in these categories should behave. This identity model of the household predicts that socially prescribed gender identity dictates that men should not do women's work at home and men should earn more than their wives. Hence, better economic independence of women challenges socially prescribed male gender identity, leading to domestic violence.

The male backlash theory, however, ignores the fact that even in the patriarchal society to which Ethiopia belongs, women can end an abusive relationship. The divorce rate in Ethiopia is relatively high despite the economic stress and social stigma towards marital resolution (Tilson & Larsen,2000). Studies on the determinants of divorce suggest that intimate partner violence is one of the significant predictors of divorce (Dagneu et al.,2020). Given this evidence, one can argue that if a working woman experiences abuse, she rationally chooses to divorce compared to nonworking women despite the social norms.

Furthermore, the male backlash model did not consider that culture embodies different gender norms in the household within the same country. Specifically, in a multi-ethnic country, gender norms differ across ethnic groups and geographical settings. Nevertheless, it should be clear that these theoretical mechanisms are not mutually exclusive and could operate simultaneously. While men use violence to maintain their power in the household by restricting women from employment, domestic violence can also push women to seek outside options such as employment.

3 Previous Empirical Evidence

The empirical evidence on the relationship between women's employment and domestic violence produces mixed results. Using data from North India and applying the instrumental variable regression method, Bhattacharya et al.(2011) investigate the effect of women's employment and house ownership on intimate violence. The result shows that women's engagement in paid work and house ownership decreases the risk of domestic violence. Similarly, using the National Crime Victimization Survey between 1993 and 2001 in the US, Aizer (2010) found that a smaller gender wage gap is related to a lower

risk of domestic violence against women.

Other studies show a positive association between women's economic empowerment and domestic violence. For example, using the first wave of the National Survey of Families and Households in the US, [Atkinson et al.\(2005\)](#) find that the wife's share of income is positively related to the likelihood of abuse by the traditional husband. Their study further suggests that the effect of relative resources is directly linked to a husband's gender ideology, such that domestic violence increases in response to a growing income share of women when the husband holds traditional gender views. Using the National Family Health Survey for India, [Paul \(2016\)](#) further shows that employed women earning more than their husbands or those with unemployed husbands are more exposed to domestic violence. On the other hand, ([Alonso-Borrego and Carrasco, 2017](#)) show that women's employment increases the risk of intimate partner violence only when their partners are not employed in Spain.

The evidence from sub-Saharan Africa shows a positive relationship between women's employment and domestic violence, supporting the male backlash theory. Using DHS data from 30 sub-Saharan African, [Cools and Kotsadam \(2017\)](#) investigate the impact of women's employment and education on the incidence and acceptance of intimate partner violence. The findings reveal that women's employment and level of education have a significant and positive correlation with intimate partner violence. This finding is more pronounced in areas where wife-beating is normalized. [Tandrayen-Ragoobur \(2020\)](#)³ confirm the positive link between women's employment and domestic violence using the same data set across 20 sub-Saharan Africa. Further, the finding shows that despite the regional variation, gender discrimination in social institutions and polygamy are important risk factors for violence. However, these findings of the positive correlation between women's employment and domestic violence could be due to simultaneity problems or omitted variables bias.

Contrary to cross-country studies for SSA, [Vyas et al \(2015\)](#) examine the impact

³These studies did not include data from Ethiopia because data on domestic violence were unavailable for the period considered in the analysis.

of access to economic resources (employment and ownership of business) on intimate partner violence using data for Dar es Salaam and Mbeya and find mixed results within the country context. The estimation results show that employed women and those who own a business alone have a higher risk of violence in Dar es Salaam but no significant evidence in Mbeya.

For Ethiopia, using data from 27 Ethiopian manufacturing companies and employing a field experiment approach, [Kotsadam and Villanger \(2022\)](#) find that a job offer reduces emotional violence by 26 percent. They also show no significant evidence of the relationship between job offers and physical and sexual violence. However, they focus on a small and selected sample of the manufacturing sector in contrast to EDHS data. Also, the authors fail to control the characteristics of the husband such as education, employment status, and alcohol consumption, which are predictors of domestic violence.

There is also scant evidence that reveals no significant relationship between women's paid employment and intimate partner violence. Using DHS data and employing instrumental variables to address the endogeneity problem, [Lenze & Klasen \(2017\)](#) show that women-paid employment has no significant causal effect on intimate partner violence in Jordan. Their finding also shows that without considering endogeneity, women's employment is positively associated with intimate partner violence. Drawing from the previous empirical literature on the link between women's employment and domestic violence, conflicting results exist between countries and within country settings, suggesting the need for further empirical evidence.

4 Data

4.1 Ethiopia Demographic and Health Survey

The data used in this analysis comes from the 2016 Ethiopia Demographic and Health Survey ([EDHS](#)). The 2016 EDHS is the fourth version following the 2000, 2005, and 2011 surveys, and the data collection was initiated by the United States Agency for Interna-

tional Development and implemented by the Ethiopian Central Statistical Agency. The EDHS adopted a two-stage cluster sampling design to obtain a nationally representative sample. In the first stage, 645 (202 in urban and 443 in rural) clusters or enumeration areas (EAs) were selected using the 2007 Ethiopian Population and Housing census with probability proportional to population size. In the second stage, 18,008 households were selected based on systematically sampling households in each cluster, and only one eligible woman aged 15-49 was randomly selected per household for the interview. The EDHS provides information on demography and experience of domestic violence among women in rural and urban areas across all eleven geographical regions in Ethiopia.

The interviewer follows a privacy protocol to handle the sensitive question of domestic violence. The presence of an adult was not allowed during the interview, and the interviewers checked the surroundings within hearing distance to ensure privacy. In this study, domestic violence against women is defined as physical, sexual, or emotional violence by the husband or partner during the last 12 months before the survey. Women who have lived with a husband are selected and asked questions about their experience of physical, sexual, and emotional violence.

The respective dimensions are constructed using the following survey items: physical violence constructed from (1) have you been pushed, shaken, or had something thrown by a husband, (2) been slapped by a husband, (3) have you been punched with a fist or hit by something harmful by a husband, (4) have you been kicked or dragged by a husband, (5) have you had arm twisted or hair pulled by husband (6) and have been threatened with a knife or other weapons by a husband. Sexual violence is constructed using the following items: (7) have you been physically forced into unwanted sex by your husband? (8) have you been forced into other unwanted sexual acts by your husband? (9) have you been physically forced to perform sexual acts that the respondent didn't want to? Emotional violence: (10) have you been humiliated by your husband? (11) have you been threatened with harm by the husband, and (12) have you been insulted by your husband?

The possible answers to all these questions were yes or no. The responses to these questions are highly correlated. The index scores of domestic violence are calculated

at the individual level by taking the sum of responses and dividing it by twelve. The index ranges from 0 to 1, with higher values indicating women experiencing all types of domestic violence. Cronbach's alpha coefficient for a test scale based on all items is 0.8566, indicating sufficient internal consistency within the items. The outcome variable is an index of domestic violence that captures the intensity of domestic violence. In addition, I calculate sub-indices for each dimension of domestic violence (emotional, physical, or sexual). For example, for physical violence, I add the first six items of response on physical violence together and divide it by six to get an index of physical violence. The index of sexual and emotional violence is calculated by taking the sum of three items' responses on sexual violence and emotional violence and dividing it by three for each sexual and emotional violence.

As robustness checks, I use a binary indicator of domestic violence, which takes value one if women have experienced any domestic violence (physical, sexual, or emotional) by a husband and equal to zero if women have not experienced all kinds of domestic violence. Additionally, EDHS provides on the severity of violence by classifying less severe and severe violence. Less severe violence is a binary variable equal to one if women experience violence such as pushing, slapping, throwing something, twisting an arm, shaking, striking with a fist or something, or dragging or kicking. The variable is equal to zero otherwise. Severe violence is also a binary variable equal to one if women experience violence such as attempting to strangle or burn, threatening with a knife or gun, and attacking with a knife or other types of weapon. This variable takes a zero value if women have not experienced severe violence. I provide the estimated results for less severe and severe violence separately.

The main interest of the variable is women's employment status. A dummy variable is equal to 1 if a woman has been working during the last 12 months during the interview, and 0 indicates if a woman did not work in the last twelve months. EDHS collects a range of questions asking women's attitudes toward justifying domestic violence. I call this variable "Acceptance of DV," capturing attitudes towards wife-beating. Acceptance of DV is a dummy variable that equals one if women agree on the justification of domestic

violence for any reason and equal to zero if women disagree with the justification of wife beating.

In addition, EDHS provides geospatial information using the survey cluster, differs from the standard EDHS data, and is available through official request. This data set links the standard EDHS survey cluster location with external data sources. In this analysis, I utilize mean annual temperature and travel time to the nearest big city as control variables to capture the impact of location and weather conditions on domestic violence. The Climate Research Unit (CRU) of the University of East Anglia produces a range of global climate time series gridded data, including the mean annual temperature data. This variable is the average annual temperature within 2 km of an urban area or 10 km within a rural area of the survey cluster location. The average time in minutes to a settlement of 50,000 or more people measures the degree of connectedness to the national transportation system and healthcare centers.

Moreover, I include other important covariates in the regression analysis not considered in the previous studies. These are ethnicity, media exposure, average domestic violence at a community level, and non-arranged first marriage. In Ethiopia, families or other close relatives may decide when and whom their daughters marry. If her first marriage took place when a woman made her marriage decision, her experience of domestic violence might be different from when her parents arranged a woman's marriage. This variable is also important in reducing the nonrandom selection to a violent marital relationship. The variable average domestic violence at a community level is constructed to capture exposure and attitude towards domestic violence within communities, excluding the woman being considered in observation.

Furthermore, I control a long list of covariates following the existing empirical work on the topic. These are characteristics of the woman and her husband such as age, age differences, education level, number of children in the household, residence location, religious affiliation, the experience of father beating mother, women's decision-making power in the household, age at first marriage, husband employment, husband education, husband alcohol consumption, and household wealth index. After omitting the missing values in the

outcome and control variables, the sample size is 4,009 ever-married/partnered women, consisting of 1,878 working women and 2,131 nonworking women aged between 15-49. The definition of control variables is available in Table A1 in the Appendix.

5 Empirical Strategy

I begin with the baseline estimation without accounting for the endogeneity issue. The linear model can be written as follows:

$$DV_i = \beta_0 + \beta_1 Employment_i + \beta_x X_i + v_i \quad (1)$$

Equation (1) is estimated using OLS. DV_i is domestic violence (physical, sexual, and emotional) against women; $Employment_i$ is a dummy variable indicating the working status of women; X_i is a set of covariates; β_0 , β_1 , and β_x are the sets of parameters to be estimated, and v_i is the error term.

5.1 Endogeneity

As discussed above, women’s employment status may be endogenous due to reverse causality and omitted variables bias. Speaking of reverse causality, domestic violence could increase women’s employment prospects or decrease their decision to work. Some studies suggest domestic violence increases women’s employment because victim women may need financial independence to end the relationship with an abusive partner ([Gedikli et al.,2023](#);[Bhattacharya,2015](#)). On the contrary, [Tolman & Wang \(2005\)](#) show that domestic violence reduces women’s employment because of its adverse impact on mental health that may hinder women from working. Thus, a causal effect cannot be identified, resulting in a biased coefficient on women’s employment. If domestic violence causes women to work more, it may lead to upward bias of the coefficient on women’s employment. If domestic violence causes women to work less, it leads to downward bias.

Regarding omitted variables bias, unobserved characteristics of the partner may

impact women’s employment decisions and violence against women simultaneously. For example, traditional husbands are more likely to discourage women’s employment. The influence of a traditional husband on domestic violence against women can be negative or positive, depending on the degree of traditionalism. To address the endogeneity issue, the model is estimated via 2SLS. The first stage of regression is written as follows:

$$Employment_i = \pi_0 + \pi_1 Z_i + \pi_x X_i + \nu_i \quad (2)$$

where Z is the instrumental variable: the average cluster employment of women. The parameter π_1 captures how the instrument variable influences the probability of women’s employment; X_1 is a set of covariates from Equation (1) ν_i is the disturbance term, capturing the remaining variance of women working status. The second stage of regression is given by:

$$DV_i = \beta_0 + \beta_1 \hat{Employment} + \beta_x X_i + v_i \quad (3)$$

In the second stage, the dependent variable is regressed on the predicted value of women’s employment status (endogenous variable) from equation (2). The coefficient β_1 estimated with 2SLS is unbiased because $\hat{Employment}$ is exogenous and uncorrelated with the error term v_i . A valid instrument should fulfill two conditions: the first condition is that the instrumental variable should be strongly correlated with the endogenous variable. In this case, the average employment rate at the community level should be strongly correlated with women’s employment status. Second, the IV should not be correlated with the outcome variable; the correlation should be only through the endogenous variable. In the empirical exercise, several specifications are estimated to test the validity of the instrument variable, and the result indicates that the average working status of women at the cluster level is a valid instrument in this analysis. Moreover, I control for community-level characteristics such as community intimate partner violence rate, distance to the nearest big town/city, and mean annual temperature to account for any weather or economic-related shock in certain areas so that Its effect is constant across the community.

6 Results

6.1 Descriptive Evidence

Table (1) presents the descriptive statistics of domestic violence by women's employment status. The summary statistics indicate that about 32 percent of married Ethiopian women have experienced domestic violence by their husbands. This figure is similar to the official statistics in Ethiopia. The DHS official data indicate that 35 percent of married women aged 15-49 report that they have experienced physical, emotional, or sexual violence from their husbands or partners (U.N Women,2016). One in five married women has experienced physical violence, and 23 percent of married women reported having experienced emotional violence by their husband/partner. In contrast, eight percent of women have experienced sexual violence in the last twelve months.

On average, 36 percent of working women have experienced domestic violence by their husbands compared to 28.9 percent of domestic violence reported by nonworking women. This difference is large and significant. Similarly, looking at different kinds of domestic violence, working women have reported a higher incidence of physical and emotional violence than nonworking women. There is no significant difference between working and nonworking women in their experience of sexual violence by husbands.

The summary statistics in Table (A2) convey distinct features between working and nonworking women in the sample. About 47 percent of women are working and slightly older than nonworking. More employed women have reported having higher levels of education than non-employed women. 29 percent of employed women have parental domestic violence experience compared to 23 percent of nonworking women. Most women are currently married, and the distribution of marital status by employment is equal.

Overall, on average, 13 percent of working women make independent decisions regarding large household purchases, and only 11 percent are nonworking women. 11 percent of working women have a husband who has completed higher education. In comparison, only 7.8 percent of nonworking have a high-skilled husband. There is no significant dif-

ference in mean annual temperature location for working and nonworking women. On average, it takes more than 108 minutes for nonworking women to reach the nearest big city than 95 minutes for working women.

6.2 Baseline result

I start by showing the correlation between women's employment and domestic violence using the OLS model based on equation (1) without considering the endogeneity of women's employment. Table (2) shows the regression results with the combined sample of working and nonworking women. In column 1, the estimation result shows a negative association between women's employment and the intensity of domestic violence. The finding is significant at a 10 percent significance level, but the magnitude is quantitatively small.

Many of the other control variables take significant coefficients of the expected sign and are consistent with the previous studies. Domestic violence is mainly associated with the husband's characteristics. While women's education level has a negative and statistically insignificant impact on the experience of domestic violence, the result reveals that a husband's education significantly reduces the incidence of domestic violence, especially among those with secondary and higher education attainment levels. This negative correlation between a husband's education and domestic violence may be attributed to several factors. Higher education may lead to higher earning, which eventually alleviate household financial stress.

Additionally, education can expose husbands to more egalitarian gender perspectives, influencing their understanding of domestic violence and women's rights within marital relationships. Notably, this study highlights that the negative association between a husband's education and domestic violence is particularly evident when the husband has attained a secondary education or higher. This suggests that a certain level of education is necessary for a partner to hold egalitarian views on gender equality within the household. On the other hand, the study notes a positive association between a husband's primary education level and domestic violence, though this finding does not reach statis-

tical significance at the conventional threshold.

The husband's employment status has a negative and significant negative impact on the experience of domestic violence. Therefore, as in previous studies (Lenze & Klasen, 2017), the finding suggests that husband employment reduces stress and frustration in the household. The result also shows that husband alcohol consumption indeed increases the probability of domestic violence. Evidence shows that alcohol consumption may trigger domestic violence (Angelucci & Heath, 2020). Living in a poor and richest household is positively and significantly associated with domestic violence. However, living in a middle and rich household has no significant association with domestic violence. The number of children in the household and household size positively impact domestic violence, but the effect is not statistically significant, except for having two small children.

According to the result, women's independent decisions on large household purchases increase the experience of domestic violence, while the joint decision with her husband reduces the probability of domestic violence. Similarly, a woman's independent decision on her first marriage (compared to when the family decides on her marriage) has a negative and significant impact on the incidence of domestic violence. The coefficient for the urban area has a negative and significant association with domestic violence. This finding is consistent with the existing empirical evidence that also shows urbanization reduces the risk of domestic violence (Cools and Kotsadam,2017; Lenze & Klasen, 2017).

Turning to exposure to media, the estimation shows that the frequency of listening to the radio is important in reducing the risk of domestic violence. I find a significant and negative association between women listening to the radio at least once a week and domestic violence. This finding indicates that listening to the radio is likely to increase the awareness of women towards domestic violence and is in line with (Cardoso & Sorenson, 2017) that shows radio access is associated with increased odds of women rejecting wife beating. However, listening to the radio less than once a week has no significant impact on the intensity of domestic violence.

Domestic violence is also positively and significantly associated with witnessing parental marital violence in childhood. Women who had witnessed a father beating their

mother at a young age have experienced a higher risk of domestic violence than women who have never seen a father beating a mother. This finding seems to suggest intergenerational transmission of domestic violence; having exposure to family violence at a young age leads to a higher risk of domestic violence against women.

6.3 Main results: Instrumental Variables Estimation

As discussed above, the endogenous variable of women's employment status is instrumented with the average employment of women at the community level. This variable is a proxy for employment opportunities for women at the community level. The average community employment of women has a strong impact on women's employment status but should not be directly correlated with husbands' violent behavior other than through its direct influence on women's employment.

Column 2 presents the result using the first-stage estimation of the effect of women's employment on the instrumental variable. As expected in column 2 of Table (2), the instrumental variable is positively and significantly associated with women's employment status in the first stage regression. The average employment of women at the community level increases the probability of women's employment by 0.948, holding everything else constant. The instrument passes all the standard tests that validate the strong instrument. To test whether women's working status is an endogenous variable, the Durbin–Wu–Hausman test rejects ($p= 0.0000$) the null hypothesis that treats women's working status as an exogenous variable. Similarly, the Wooldridge robust score indicates that I cannot treat women's employment status as an exogenous variable. For weak identification, I report F statistics of 97.72. [Stock et al.\(2002\)](#) suggest that the F statistic should exceed 10 for inference based on the 2SLS estimator to be reliable when there is one endogenous regressor. The F-statistics in this estimation exceed the rule-of-thumb threshold of 10.

Table (2) of column 3 reports the estimated coefficient using the 2SLS model. The result shows that women's employment status significantly reduces domestic violence by

about 15 percentage points. The effect is quantitatively quite substantial. Given the 32 percent of the sample mean with domestic violence, it implies that women's employment status decreases the risk by 46.8 percent. The result in Table (2) suggests a negative and significant relationship between women's employment and domestic violence using both OLS and IV approaches.

The estimated coefficient from the instrumental variable regression is larger in magnitude than in the ordinary least square model. This may be because OLS estimates the average treatment effect (ATE) over the entire population. In contrast, IV estimates the local average treatment effect (LATE) only for the population whose choice of treatment is affected by the instrument. LATE is the change in domestic violence due to women's employment status for those subgroups of the population for whom the instrument induces a change in the probability of women's employment. It could also be that the OLS estimator is biased due to the correlation between the variable of interest (women's employment) and the error term.

The estimated coefficient for other control variables is informative. Like the linear probability model, the women's education level has no causal effect on the intensity of domestic violence. Husbands' secondary and higher levels of education significantly lower the intensity of domestic violence. A husband's secondary level of education reduces the risk of domestic violence by 3 percentage points. When he has a higher level of education, the risk of domestic violence decreases by 3.5 percentage points. The results for all other control variables are similar to the linear probability model except for wealth index and women's decision on their first marriage, which has no longer significant causal effect on domestic violence

6.4 Dimensions of domestic violence

So far, I have used aggregate domestic violence, which encompasses physical, sexual, and emotional violence. I have conducted separate estimations for each kind of violence to understand the effect of women's employment on specific types of domestic violence.

Table (3) presents the estimation results for different dimensions, such as physical, sexual, and emotional violence, using the 2SLS model. Column (1) shows the regression result of physical violence. The result indicates that employed women have a lower risk of physical than their nonworking counterparts. Working women have an 18 percentage points lower risk of physical violence than nonworking women. Similarly, the regression result in columns (2) and column (3) shows that women's employment status reduces the intensity of sexual and emotional violence by 10 and 16 percentage points, respectively.

Table (3) shows that having a job has negative and significant effects on the intensity of physical, emotional, and sexual violence. This finding provides support for the household bargaining theory but is in contrast to a study carried out by (Kotsadam & Villanger, 2022). They show that having a job offer in the manufacturing sector has no significant effect on reducing physical and sexual violence in Ethiopia. These two studies obtained opposite evidence, which might be due to different datasets, sampling, and methodologies. Hence, comparing the two studies should be done cautiously.

6.5 Heterogeneous effects

In Table (4), I perform a heterogeneity analysis for rural and urban residence areas separately. The distinction of a place of residence is relevant in the estimation of domestic violence, as the majority of women live in rural areas. Women in rural areas also have limited access to health information and law enforcement services prohibiting gender-based violence. Besides, in rural areas, the gender norms confine women socially and economically to an inferior status and attitude that wife beating is more acceptable than in urban areas. This trend is consistent with empirical evidence from sub-Saharan Africa. For example, Nabaggala et al.(2021) reveals a higher prevalence of domestic violence in rural areas than urban ones. In line with this established evidence, the main result observed in Table (3) corroborates that residing in an urban area is associated with a lower incidence of domestic violence than in rural areas.

The estimation result in Table (4) shows that women's employment reduces the

risk of domestic violence in urban and rural areas. The estimated coefficient of women's employment for rural areas is bigger than for urban area estimation results. This evidence underscores the importance of enhancing employment opportunities for women as a crucial strategy in mitigating the risk of domestic violence in both rural and urban contexts.

6.6 Robustness checks

I conducted a series of robustness checks to assess the sensitivity of the main findings to different definitions of outcome variables. I repeated the primary estimation outlined in Table (2), utilizing a binary indicator of domestic violence. Table (5) presents the result of the estimated coefficient, employing the 2SLS method. In the first column of Table (5), the outcome variable is a binary dummy variable, taking the value of one if women experienced any form of domestic violence (physical, sexual, or emotional). Additionally, the data distinguishes between the experience of less severe and severe types of domestic violence. In column 2, the outcome variable is a binary variable set equal to one if women encountered less severe domestic violence and column 3 displays the findings for severe domestic violence.

Table (5) reaffirms that women's employment reduces the likelihood of domestic violence, aligning with the findings drawn from the main estimations in Table (2). The estimation results demonstrate a statistically significant and negative effect of women's employment on less severe and severe types of domestic violence. In further pursuit of robustness, I perform two additional checks to see if different estimation methods change the main result. Firstly, I considered the potential endogeneity of the husband's alcohol consumption as it might be influenced by domestic violence. An abusive husband may leave the house and drink alcohol as a coping mechanism. Hence, provide the estimated coefficient without controlling for the husband's alcohol consumption.

Secondly, I excluded the characteristics of the survey and included them step-wise to assess whether the omission of specific control variables influenced the results. Table A3 in the Appendix presents the estimated coefficient using the 2SLS model, mirroring the

primary IV estimation result in Table (2). Additionally, exploring alternative estimation methods, I employed an instrumental variables probit model as an alternative to 2SLS and a probit model instead of the linear probability model. Table (A4) reports the IV probit results in the Appendix. The estimation result remains the same for both quantitatively and qualitatively.

6.7 Comparison of the results with the literature

Existing studies have yielded inconclusive findings regarding the relationship between women's employment status and domestic violence. The estimation result remains true for different dimensions of domestic violence, such as physical, sexual, and emotional. Furthermore, being employed has a negative and significant effect on the risk of domestic violence in both rural and urban places of residence. This aligns with the household bargaining theory, which posits that independent income from employment strengthens women's bargaining position within the household, thereby decreasing the risk of domestic violence.

Existing studies have demonstrated inconclusive results on the relationship between employment status and domestic violence against women. [Bhattacharya et al.\(2011\)](#) find that women's employment has a negative effect on their experience of intimate partner violence. By contrast, [Cools and Kotsadam \(2017\)](#) find in their cross-country study for sub-Saharan Africa that being employed has a positive association with the experience of domestic violence against women. Similarly, using the DHS data in their cross-country study, [Tandray-Ragoobur \(2020\)](#) shows that the employment of women is positively correlated with the incidence of domestic violence for sub-Saharan Africa. The study by [Alonso-Borrego and Carrasco \(2017\)](#) emphasizes that women's employment has a positive effect on domestic violence only if the husband is not employed.

The empirical analysis in this study supports [Bhattacharya et al.\(2011\)](#) findings, demonstrating a significant negative effect of women's employment on domestic violence using an IV regression approach. This effect persists even after accounting for factors such

as attitudes toward wife beating, community-level domestic violence rates, and husband characteristics like employment status, education, and age. Thus, the evidence suggests that women's employment not only enhances their labor market outcomes but also reduces their vulnerability to domestic violence.

7 Conclusion

Intimate partner violence is a human rights violation and a pervasive health problem worldwide. The pattern and degree of domestic violence are very high in Sub-Saharan Africa. Against this background, having employment is instrumental in improving women's well-being and economic empowerment. However, according to existing evidence, it is unclear whether women's employment status lowers the risk of domestic violence. This study was motivated by the high prevalence of domestic violence against women in Ethiopia and the ambiguity of existing empirical evidence on the relationship between women's employment status and domestic violence. Most importantly, conflicting results from developed and developing countries suggest the need for a comprehensive analysis using a nationally representative dataset across different country contexts.

Using data from Ethiopia, this study examines the relationship between women's economic empowerment, measured by their employment status, and domestic violence. This paper treats women's employment status as an endogenous variable and is instrumented using the average women's employment rate at the community level. This community's average employment rate is a proxy for women's employment opportunities at the community level. Moreover, I merge individual-level data with external geospatial satellite data to consider the social, economic, and weather differences at the community level.

The results show that women's employment is negatively correlated with domestic violence without considering the endogenous variable of women's employment. This finding is significant but quantitatively small. After addressing the endogeneity issue, the IV regression results show that women's employment reduces the intensity of domestic violence by 15 percentage points. This finding supports the household bargaining theory.

Similar patterns of results were obtained across different empirical strategies. I use a binary indicator of domestic violence instead of an index of domestic violence as a sensitivity test, and the result shows that women's employment has negative and significant effects on the probability of domestic violence against women. The same is true for different forms of domestic violence (physical, sexual, and emotional), less severe and severe types of domestic violence, and across urban and rural places of residence.

It is crucial to acknowledge the limitations of this paper. Like many other survey responses, the response to information on domestic violence questions is self-reported, which can lead to survey response bias. Objective data on domestic violence are unavailable for Ethiopia. Underreporting of domestic violence by women is also a concern. It is important to recognize that there may still be other sources of omitted variables bias that I cannot consider in this paper.

This paper concludes with a remark on the need for detailed labor market data that encompasses information like working hours and the employment sector. Such data would enable a more nuanced exploration of the relationship between domestic violence and women's labor market outcomes. Moreover, analyzing the effect of informal and formal employment on domestic violence is vital in a context where many women are engaged in the informal sector. As EDHS is cross-section data, I do not have panel data to follow individuals and provide further comprehensive causal evidence of the effect of women's employment status on the intensity of domestic violence over time.

Despite these limitations, the estimation results consistently underscore the significance of women's employment outcomes in mitigating domestic violence. The evidence gleaned from this study strongly suggests that policies geared towards expanding employment opportunities for women can be an effective intervention to curtail intimate partner violence. This insight not only aligns with the broader aim of promoting gender equality and women's empowerment but also underscores the multifaceted positive outcomes that can emerge from enhancing women's economic participation.

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The author declares that there is no conflict of interest.

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Table 1: Summary Statistics of Domestic Violence by Working Status

| | (1) | (2) | (3) | (4) |
|------------------------------|------------------|------------------|------------------|---------------|
| | Full sample | Working | Not Working | Difference |
| | Mean | Mean | Mean | col(2)-col(3) |
| Dummy indicator of DV | | | | |
| Domestic violence | 0.322 (0.467) | 0.359 (0.479) | 0.289 (0.453) | 0.070*** |
| Physical violence | 0.211 (0.407) | 0.235 (0.424) | 0.189 (0.392) | 0.045*** |
| Sexual violence | 0.081 (0.273) | 0.086 (0.281) | 0.076 (0.265) | 0.009 |
| Emotional violence | 0.237 (0.426) | 0.261 (0.439) | 0.217 (0.412) | 0.045*** |
| Index measure of DV | | | | |
| Domestic violence | 0.081 (0.159) | 0.088 (0.163) | 0.075 (0.156) | 0.013** |
| Physical violence | 0.080 (0.187) | 0.088 (0.194) | 0.073 (0.181) | 0.015** |
| Sexual violence | 0.049 (0.170) | 0.050 (0.172) | 0.046 (0.168) | 0.004 |
| Emotional violence | 0.154 (0.291) | 0.168 (0.298) | 0.142 (0.283) | 0.027*** |
| Observations | 4,009 | 1,878 | 2,131 | |

Notes: This table displays summary statistics of domestic violence by employment status using binary and index measures of domestic violence. Column (1) shows statistics for the full sample, column (2) for the working women subsample, and column (3) for the nonworking women subsample. Column (4) shows the t-test difference in means between columns (2) and (3). The statistical significance of the differences is denoted by asterisks *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Descriptive statistics and regression estimation were adjusted for survey weights using the weighting variable available with the data.

Table 2: Estimated coefficient from LPM and 2SLS

| | (1) | (2) | (3) |
|---------------------------------|-----------------------|----------------------|----------------------|
| | OLS | First stage | 2SLS |
| Working status | -0.009* (0.006) | | -0.151*** (0.037) |
| Acceptance of DV | 0.014** (0.006) | 0.039** (0.0157) | 0.026*** (0.009) |
| Woman: Age | 0.001*** (0.0004) | 0.003*** (0.001) | 0.002*** (0.0007) |
| Women: primary education | -0.0006 (0.007) | 0.054*** (0.019) | 0.004 (0.010) |
| Women: secondary education | 0.012 (0.013) | 0.061* (0.033) | 0.009 (0.019) |
| Women: higher education | 0.019 (0.017) | 0.359*** (0.043) | 0.065** (0.025) |
| Women decide on first marriage | -0.013** (0.006) | -0.049*** (0.017) | -0.011 (0.010) |
| Currently married | 0.017*** (0.006) | -0.001 (0.017) | 0.017* (0.009) |
| Age at first marriage | -0.002*** (0.0007) | 0.0006 (0.002) | -0.002* (0.001) |
| Husband: primary education | -0.0003 (0.006) | 0.044** (0.019) | 0.005 (0.010) |
| Husband: secondary education | -0.019* (0.010) | -0.040 (0.028) | -0.030** (0.014) |
| Husband: higher education | -0.034** (0.013) | -0.051 (0.033) | -0.035** (0.018) |
| Husband drinks alcohol | 0.082*** (0.007) | 0.045** (0.020) | 0.095*** (0.013) |
| Husband employed | -0.051*** (0.009) | 0.161*** (0.025) | -0.021 (0.019) |
| Age difference | 0.0003 (0.0004) | 0.0009 (0.0009) | 0.0001 (0.0007) |
| Wealth index: poor | 0.016* (0.008) | -0.034 (0.023) | 0.013 (0.014) |
| Wealth index: middle | 0.011 (0.009) | -0.015 (0.025) | 0.007 (0.015) |
| Wealth index: rich | 0.006 (0.009) | -0.035 (0.024) | -0.0009 (0.014) |
| Wealth index: richest | 0.011* (0.007) | -0.017 (0.018) | 0.012 (0.010) |
| Urban | -0.012* (0.007) | -0.016 (0.011) | -0.023 (0.019) |
| Household size | 0.0009 (0.007) | 0.006 (0.012) | 0.019 (0.019) |
| Women decide in HH purchase | 0.036*** (0.009) | 0.112*** (0.026) | 0.065*** (0.020) |
| Women decide with partner in HH | -0.031*** (0.006) | 0.040** (0.018) | -0.021* (0.011) |

Continued from Table 2...

| | (1) | (2) | (3) |
|-------------------------------------|-------------------------|-------------------------|-------------------------|
| | OLS | First stage | 2SLS |
| One child in HH | 0.004 (0.007) | 0.001 (0.011) | -0.078*** (0.019) |
| Two children in HH | 0.007 (0.008) | -0.005 (0.013) | -0.102*** (0.021) |
| Three Children in HH | 0.0012 (0.011) | -0.004 (0.021) | -0.103*** (0.032) |
| More than 3 children in HH | 0.021 (0.029) | -0.016 (0.057) | -0.239*** (0.079) |
| Father beats mother | 0.051*** (0.006) | 0.056*** (0.010) | 0.037** (0.017) |
| Religion: Orthodox | -0.042** (0.020) | -0.053 (0.036) | -0.063 (0.064) |
| Religion: Catholic | -0.033 (0.039) | -0.027 (0.052) | -0.125 (0.129) |
| Religion: Protest | -0.019 (0.020) | -0.037 (0.037) | -0.102 (0.063) |
| Religion: Muslim | 0.0002 (0.020) | -0.033 (0.036) | -0.224*** (0.064) |
| Radio at least once/week | 0.010 (0.007) | 0.022 (0.014) | 0.039* (0.022) |
| Radio more than once/week | -0.043*** (0.008) | -0.032*** (0.011) | 0.017 (0.022) |
| Translation | -0.024*** (0.009) | -0.031 (0.022) | -0.038** (0.016) |
| Length of the interview | -0.0001 (0.0001) | -0.0004 (0.0004) | -0.0003 (0.0002) |
| Average annual temperature | -0.004*** (0.001) | -0.004** (0.002) | 0.003 (0.003) |
| Travel time to nearest city | 0.0001*** (3.54e-05) | 0.0001*** (5.58e-05) | 0.0002*** (9.05e-05) |
| Average DV at cluster level | 0.446*** (0.049) | 0.430*** (0.078) | -0.008 (0.138) |
| Cluster average employment of women | | | 0.948*** (0.073) |
| Constant | 0.124*** (0.039) | 0.170*** (0.065) | -0.137 (0.112) |
| Observations | 4,009 | 4,009 | 4,009 |
| R-squared | 0.174 | 0.130 | 0.262 |
| Endo test(p-value) | | 17.82 (0.0000) | |
| F-stats | | 97.718 | |

Notes: The dependent variable is the index of domestic violence. The first column presents the results of estimated coefficients using LPM. Column 2 presents the first stage estimation where the dependent variable is women's employment status. Column 3 shows the result of IV estimation, and Survey weight is used for all estimations using the weight variable available with the data. The R2 is quite low; however, R2 is generally not considered an accurate measure of overall fit in the case of a linear probability model (Arnold H. Studenmund 2011). Standard errors are clustered at the community level and are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: Estimation results from 2SLS

| | (1) | (2) | (3) |
|---------------------|----------------------|---------------------|---------------------|
| | Physical violence | Sexual violence | Emotional violence |
| Working status | -0.184*** (0.044) | -0.104** (0.053) | -0.158** (0.068) |
| Constant | 0.160** (0.077) | 0.133 (0.082) | 0.260** (0.112) |
| Observations | 4,009 | 4,009 | 4,009 |
| R-squared | 0.101 | 0.064 | 0.098 |
| Endo test (p-value) | 18.44 (0.000) | 2.91 (0.088) | 7.20 (0.007) |
| F-stats | 97.72 | 97.72 | 97.72 |

Notes: The table shows the estimated coefficients using the 2SLS method. The dependent variable in column (1) is the index of physical violence, column (2) is the index of sexual violence, and column (3) is the index of domestic violence. The set of control variables includes wife/husband education, wife/husband age, age difference, currently married, husband drinks alcohol, women's decision in large household (HH) purchase, women's decision of marriage, age at first marriage, and dummy variables for ethnicity, religion, children in the HH, household size index of wealth, mean annual temperature, travel time, average domestic violence at a community level, translation, acceptance of DV, length of interview, place of residence and regions. The estimation used survey weight. Standard errors are reported in parentheses and clustered at cluster (community level) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Estimation results from 2SLS

| | (1) | (2) |
|---------------------|----------------------|----------------------|
| | Urban | Rural |
| Working status | -0.124*** (0.039) | -0.180*** (0.060) |
| Constant | 0.112 (0.092) | 0.179** (0.086) |
| Observations | 1,245 | 2,764 |
| R-squared | 0.125 | 0.049 |
| Endo test (p-value) | 8.95 (0.002) | 10.28 (0.001) |
| F-stats | 68.60 | 40.08 |

Notes: The table shows the estimated coefficients using the 2SLS method. The dependent variable is an index of domestic violence. Column (1) shows the estimated coefficients using the 2SLS method for the urban area subsample, and column (2) reports the estimated coefficients using the 2SLS method for the rural area subsample. The set of control variables includes wife/husband education, wife/husband age, age difference, currently married, husband drinks alcohol, women's decision in large household (HH) purchase, women's decision of marriage, age at first marriage, and dummy variables for ethnicity, religion, children in the HH, household size index of wealth, mean annual temperature, travel time, average domestic violence at a community level, translation, acceptance of DV, length of interview, and place of residence and regions. The estimation used survey weight. Standard errors are reported in parentheses and clustered at cluster (community level) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5: Estimated coefficient from 2SLS. Robustness checks

| | (1) Domestic violence | (2) Less violence | (3) Severe violence |
|----------------------|-----------------------------|-------------------------|---------------------------|
| Working status | -0.395*** (0.095) | -0.402*** (0.096) | -0.158** (0.066) |
| Constant | 0.490*** (0.174) | 0.406** (0.178) | 0.169 (0.124) |
| Observations | 4,009 | 4,009 | 4,009 |
| R-squared | 0.077 | 0.015 | 0.058 |
| Endo test (pv-value) | 20.16 (0.000) | 19.99 (0.000) | 5.42 (0.020) |
| F-stats | 97.72 | 97.72 | 97.72 |

Notes: Dependent variable is a binary indicator of domestic violence. The table shows the estimated coefficients using the 2SLS method. Independent variables are wife/husband education, wife/husband age, age difference, currently married, husband drinks alcohol, women's decision in large household (HH) purchase, women's decision of marriage, age at first marriage, and dummy variables for ethnicity, religion, children in the HH, household size index of wealth, mean annual temperature, travel time, average domestic violence at a community level, translation, acceptance of DV, length of interview, place of residence and regions. The table shows the estimated coefficients. The R2 is quite low; however, R2 is generally not considered an accurate measure of overall fit in the case of a linear probability model (Arnold H. Studenmund 2011). The estimation used survey weight. Standard errors are reported in parentheses and clustered at cluster (community level) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Appendix

Table A1: Definitions of control variables

| Variables | Definition |
|--------------------------------|---|
| Women age difference | Age of women/wife in years The age difference between the spouse. The age difference is computed by subtracting the women's age from the husband's. |
| Women: primary education | The highest level of education completed. A dummy variable equals 1 if a woman has completed a primary level of education. |
| Women: secondary education | The highest level of education women completed. A dummy variable equals 1 if a woman has completed a secondary level of education. |
| Women: higher education | A dummy variable equals 1 if a woman has completed a higher level of education. The reference category is women with no education. Primary education is schooling from grades 1 to 6, secondary is schooling from grades 7 to 12, and higher is a university or college-level education. |
| One child in HH | A dummy equals 1 if the woman has one child under the age of five living in the household. |
| Two children in HH | A dummy equals 1 if the woman has two children under the age of five living in the household. |
| Three children in HH | A dummy equals 1 if the woman has three children under the age of five living in the household. |
| More than three children in HH | A dummy equals 1 if the woman has more than children under the age of five living in the household. |
| Urban | A dummy equals 1 if the woman's residence is in an urban area. A dummy equals 0 if a woman's residence is in a rural area. |
| Household size | The number of people living in the same household. A dummy variable equals 1 if the household size is six and more than six. This variable takes the value 0 if the household size is five and under five. |
| Wealth index | Household wealth index are computed based on the household assets and items they own, such as cars, bicycles, toilet facilities, and flooring materials. The wealth index is categorized as, poor, middle, richer, and richest. Each indicator is included in the regression, and the base category is the poorest household. |
| Currently married | A dummy equals 1 if women are currently married and equal to zero if formally or never married |
| Age at first marriage | The age of women in years at first marriage/cohabitation. |

Table A1: Definitions of control variables

| Variables | Definition |
|--|--|
| Radio less than once per week | This variable captures the frequency of radio listening. A dummy equals 1 if women listen to the radio less than once per week. |
| Radio at least once per week | A dummy equals 1 if women listen to the radio at least once weekly. The base category is if a woman does not listen to the radio at all |
| Acceptance of DV | This variable is constructed using the following five indicators. i) beating justified if the wife goes out without telling the husband; ii) beating justified if the wife neglects the children; iii) beating justified if the wife argues with the husband; and iv) beating justified if a wife refuses to have sex with husband, and vi) beating justified if wife burns the food. A dummy variable equals one if women justify beating a wife for any mentioned reason and equals zero if women disagree with a justification of beating a wife. |
| Women decide on first marriage | A dummy equals 1 if the woman decides by herself when she gets married for the first time and equals zero if family or other relatives decide on her marriage. This variable also takes a value 0 if women never married. |
| Women decide alone on HH purchase | This variable capture the decision of women on large household purchase. A dummy variable equals 1 if a woman makes independent decisions on large household purchases. |
| Women decide with their husbands on HH purchases | A dummy variable equals 1 if a woman decides jointly with their husband/partners on large household purchases. The reference category is if women do not decide at all. |
| Religion: Muslim | A dummy variable equals 1 if the woman is affiliated with the Muslim religion. |
| Religion: Protestant Christian | A dummy variable equals 1 if the woman is affiliated with the protestant religion. |
| Religion: Catholic Christian | A dummy variable equals 1 if the woman is affiliated with the catholic religion. |
| Religion: Orthodox Christian | A dummy variable equals 1 if the woman is affiliated with the Orthodox religion. The variable is equal to zero if women are affiliated with either traditional or other religions. |
| Father beats mother | A dummy equals 1 if a woman has experienced as a child when her father beats her mother. Since not all women memorize parental marital relationship experiences or are sure about the experience of violence that happened long ago, I have also included a dummy variable for the missing information as a control variable. The reference category takes value 0 if a woman has not experienced her father beating her mother. |

Table A1: Definitions of control variables

| Variables | Definition |
|---------------------------------|---|
| Husband working | A dummy equals 1 if the husband/partner worked in the past 12 months. This variable takes a value of 0 if the husband/partner did not work in the past 12 months. |
| Husband: primary education | The highest level of education completed. A dummy variable equals 1 if a husband has completed a primary level of education. |
| Husband: secondary education | The highest level of education husband completed. A dummy variable equals 1 if a husband has completed a secondary level of education. |
| Husband: higher education | A dummy variable equals 1 if a husband has completed a higher level of education. The reference category takes value 0 if a husband has no education. Primary education is schooling from grades 1 to 6, secondary is schooling from grades 7 to 12, and higher is a university or college-level education. |
| Husband drinks alcohol | A dummy equals 1 if the husband drinks alcohol. A dummy variable equals zero if the husband does not drink alcohol |
| Travel time to the nearest city | Time (in minutes) required to reach the nearest big city with a population of 50,000 and beyond from the DHS survey cluster location, based on 2015 data. Travel time measures the degree of their connectedness to the national transportation system and access to health care centers. |
| Mean annual temperature | The average temperature at the DHS survey cluster location for a given year. The mean temperature is a modeled surface based on weather station data. This dataset was produced by taking the average of the twelve monthly data sets for a given year. |
| Length of interview | Length of interview in minutes to complete the survey. |
| Translation | A dummy equals one if a translation is used during the interview and equals zero if the interview takes place without the use of translation. |
| Ethnicity dummies | The ethnic group of women. More than 96 different ethnicity information is available in the data, but most of this information has very few observations. Therefore, I have combined those ethnic groups below 30 observations into other ethnic groups. Eighteen different ethnic groups of women, such as Amhara, Oromo, Tigray, Affar, Somalie, Guragie, Sidama, Nuwer, Welaita, Berta, Keficho, Gumuz, Hadiya, Gamo, Silte, Anyiwak, Kembata, and Gedeo are included as a dummy variable. The base category is other ethnic groups. |
| Region dummies | Ten federal state/administration dummies; this includes Afar, Amhara, Oromia, Somali, Benishangul Gumuz, SNNPR, Gambela, Harari, Addis Ababa, and Dire Dawa. The reference category is Tigray. |

Table A2: Descriptive Statistics

| | Pooled | | Working | | Not working | |
|--|--------|-----------|---------|---------|-------------|----------|
| | Mean | Std. dev. | Mean | Std.dev | Mean | Std.dev. |
| Working status | 0.468 | 0.499 | | | | |
| Woman: Age | 30.40 | 7.76 | 31.03 | 7.67 | 29.84 | 7.79 |
| Women: higher education | 0.050 | 0.218 | 0.089 | 0.285 | 0.016 | 0.125 |
| Women: secondary education | 0.089 | 0.284 | 0.095 | 0.293 | 0.083 | 0.276 |
| Women: primary education | 0.277 | 0.448 | 0.296 | 0.457 | 0.260 | 0.438 |
| Father beats mother (missing) | 0.059 | 0.235 | 0.067 | 0.249 | 0.052 | 0.221 |
| Father beats mother | 0.258 | 0.438 | 0.287 | 0.453 | 0.232 | 0.422 |
| Radio less than once/a week | 0.135 | 0.342 | 0.161 | 0.368 | 0.112 | 0.316 |
| Radio at least once/a week | 0.148 | 0.355 | 0.171 | 0.376 | 0.127 | 0.333 |
| Women decide on first marriage | 0.436 | 0.496 | 0.415 | 0.493 | 0.454 | 0.498 |
| Age at first marriage | 17.31 | 3.96 | 17.47 | 4.086 | 17.16 | 3.84 |
| Translation | 0.332 | 0.471 | 0.263 | 0.440 | 0.392 | 0.488 |
| Length of interview | 23.15 | 19.88 | 22.93 | 19.43 | 23.34 | 20.26 |
| Acceptance of DV | 0.614 | 0.487 | 0.607 | 0.488 | 0.620 | 0.485 |
| Currently married | 0.729 | 0.444 | 0.727 | 0.445 | 0.730 | 0.444 |
| Age difference | 7.97 | 7.42 | 7.81 | 7.62 | 8.11 | 7.23 |
| Husband drinks alcohol | 0.258 | 0.437 | 0.345 | 0.476 | 0.181 | 0.385 |
| Husband work | 0.902 | 0.298 | 0.949 | 0.219 | 0.859 | 0.349 |
| Husband: primary education | 0.094 | 0.292 | 0.112 | 0.315 | 0.078 | 0.268 |
| Husband: secondary education | 0.128 | 0.334 | 0.136 | 0.343 | 0.121 | 0.326 |
| Husband: higher education | 0.312 | 0.463 | 0.344 | 0.475 | 0.283 | 0.451 |
| Household size | 0.189 | 0.392 | 0.193 | 0.395 | 0.187 | 0.389 |
| Richest wealth index | 0.346 | 0.476 | 0.358 | 0.479 | 0.336 | 0.473 |
| Rich wealth index | 0.122 | 0.328 | 0.115 | 0.319 | 0.129 | 0.335 |
| Middle wealth index | 0.111 | 0.315 | 0.109 | 0.312 | 0.114 | 0.317 |
| Poor wealth index | 0.140 | 0.347 | 0.136 | 0.343 | 0.144 | 0.351 |
| One child in HH | 0.376 | 0.484 | 0.379 | 0.485 | 0.374 | 0.484 |
| Two children in HH | 0.281 | 0.449 | 0.236 | 0.425 | 0.321 | 0.467 |
| Three children in HH | 0.067 | 0.249 | 0.051 | 0.219 | 0.081 | 0.272 |
| More than Three children in HH | 0.008 | 0.092 | 0.003 | 0.056 | 0.013 | 0.114 |
| Women decide with husband on HH purchase | 0.644 | 0.479 | 0.665 | 0.472 | 0.625 | 0.484 |
| Women decide alone on HH purchase | 0.122 | 0.328 | 0.135 | 0.342 | 0.111 | 0.314 |

Table A2: Descriptive Statistics

| | Full sample | | Working | | Not working | |
|-----------------------------------|-------------|-----------|---------|---------|-------------|----------|
| | Mean | Std. dev. | Mean | Std.dev | Mean | Std.dev. |
| Religion: Muslim | 0.424 | 0.494 | 0.297 | 0.457 | 0.536 | 0.499 |
| Religion: Protestant | 0.186 | 0.389 | 0.193 | 0.394 | 0.180 | 0.384 |
| Religion: Catholic | 0.004 | 0.063 | 0.004 | 0.065 | 0.004 | 0.061 |
| Religion: Orthodox | 0.371 | 0.483 | 0.488 | 0.499 | 0.267 | 0.443 |
| Urban | 0.311 | 0.462 | 0.319 | 0.466 | 0.303 | 0.459 |
| Afar | 0.072 | 0.258 | 0.070 | 0.256 | 0.073 | 0.260 |
| Amhara | 0.113 | 0.317 | 0.114 | 0.318 | 0.113 | 0.317 |
| Oromia | 0.127 | 0.332 | 0.116 | 0.320 | 0.136 | 0.343 |
| Somali | 0.098 | 0.297 | 0.094 | 0.292 | 0.101 | 0.302 |
| Benishangul/Gumuz | 0.076 | 0.264 | 0.072 | 0.259 | 0.078 | 0.269 |
| SNNPR | 0.108 | 0.309 | 0.101 | 0.302 | 0.113 | 0.317 |
| Gambela | 0.088 | 0.283 | 0.088 | 0.280 | 0.090 | 0.286 |
| Harari | 0.059 | 0.235 | 0.063 | 0.244 | 0.055 | 0.228 |
| Addis Ababa | 0.092 | 0.288 | 0.107 | 0.309 | 0.078 | 0.268 |
| Dire Dawa | 0.069 | 0.253 | 0.069 | 0.255 | 0.068 | 0.251 |
| Mean annual temperature | 22.90 | 3.71 | 21.65 | 3.53 | 22.48 | 3.82 |
| Average cluster domestic violence | 0.075 | 0.039 | 0.076 | 0.039 | 0.074 | 0.039 |
| Travel times to the nearest city | 102.50 | 99.88 | 95.30 | 96.55 | 108.83 | 102.32 |
| Observations | 4,009 | | 1,878 | | 2,131 | |

Notes: Survey weight used for all estimation and summary statistics. Expect the age of the woman and husband. All control variables are dummy variables.

Table A3: Estimated coefficient from 2SLS

| | (1) | (2) | (3) |
|------------------------|----------------------|----------------------|----------------------|
| Working status | -0.141*** (0.039) | -0.152*** (0.038) | -0.140*** (0.038) |
| Translation | | | -0.036** (0.016) |
| Length of interview | | | -0.0003 (0.0002) |
| Acceptance of DV | | | 0.025*** (0.009) |
| Husband drinks alcohol | | 0.095*** (0.013) | |
| Constant | 0.201*** (0.065) | 0.170*** (0.064) | 0.201*** (0.066) |
| Observations | 4,009 | 4,009 | 4,009 |
| R-squared | 0.008 | 0.023 | 0.019 |
| Endo test (p-value) | 15.74 (0.0001) | 18.33 (0.0000) | 15.23 (0.0001) |
| F-stats | 96.6499 | 93.8804 | 100.21 |

Notes: Dependent variable: index of domestic violence. Column (1) Independent variables are wife/husband education, wife/husband age, age difference, currently married, husband drinks alcohol, women's decision in large household (HH) purchase, women's decision of marriage, age at first marriage, and dummy variables for ethnicity, religion, children in the HH, household size index of wealth, mean annual temperature, travel time, average domestic violence at a community level, and place of residence and regions. The table shows the estimated coefficients. The estimation used survey weight. Standard errors are reported in parentheses and clustered at cluster (community level) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A4: Estimated coefficient from probit and IV probit.

| | (1) Probit | (2) IV-probit | (3) First stage |
|-------------------------------------|--------------------------------|----------------------------------|--------------------------------|
| Working status | 0.0007 [0.0002] (0.0712) | -1.136*** [-0.392] (0.199) | |
| Cluster average employment of women | | | 3.099*** [1.235] (0.325) |
| Constant | -0.457 (0.533) | -0.041 (0.485) | -1.944*** (0.517) |
| Correlation between the error terms | | | 0.529*** (0.089) |
| Wald test for exogeneity (p-value) | | | 22.41 (0.000) |
| Number of observations | 4,009 | 4,009 | 4,009 |

Notes: Dependent variable is a binary measure of domestic violence. The table shows the estimated coefficients. The first stage of estimation is using the probit model. Average marginal effects on the probability of domestic violence are in square brackets. Control variables are wife/husband education, wife/husband age, age difference, currently married, women's decision in large household (HH) purchase, women's decision of marriage, age at first marriage, and dummy variables for ethnicity, religion, transition, interview length, DV acceptance, children in the HH, household size index of wealth, mean annual temperature, travel time, average domestic violence at a community level, translation, acceptance of DV, length of interview, and place of residence and regions. The estimation used survey weight. Standard errors are reported in parentheses and clustered at cluster (community level) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$