Domestic Violence, Decision-Making Power and Female Employment in Colombia

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Abstract

Using data from the Colombian Demographic and Health Survey, I study the relationship between domestic violence (DV) and womens employment. I find a positive relationship between DV and employment, which persists when I exploit husbands childhood experience of domestic violence as a source of plausibly exogenous variation for the incidence of DV. I find that the incidence of DV increases the likelihood of female employment by about 19 percentage points. To explain the results, I explore the role of womens decision-making power using a mediation analysis. I find evidence that women may work to escape violent situations at home by enhancing their decision-making power. I also find that the effect of DV on employment appears to be lower among abused women with higher initial bargaining power.

Keywords: domestic violence; employment; women's decision-making power; Colombia
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1 Introduction

The World Health Organization reports striking findings on the prevalence and effects of violence against women. Almost one third of all women worldwide who have been in a marital relationship have experienced physical or sexual violence perpetrated by their male partners (World Health Organization, 2013). Most of these women report serious physical and mental health consequences, which include permanent injuries, pregnancy-related complications and impaired social functioning. In Latin America and the Caribbean, according to the World Health Organization estimates, about 24% of ever-partnered women report some exposure to physical domestic violence. Colombia is one of the countries in the region where violence against women is highly prevalent; in 2010, 37% of Colombian women reported physical or sexual spousal abuse over their lifetime, as well as several physical and psychological consequences associated with it (Profamilia, 2011). Domestic violence also affects labor market outcomes: victims reported that spousal violence affected their performance in daily activities and their labor productivity.

Most empirical studies focus on the determinants of spousal violence, including women's employment, with mixed results. Aizer (2010) exploits variation in industry-specific labor demand and finds that decreases in the male-female wage gap reduce violence perpetrated by domestic partners. Bhattacharyya, Bedi, and Chhachhi (2011) suggest that boosting a wife's economic status generates struggle within the household and leads to *more* violence. Heath (2014) focuses on access to factory jobs and finds that women with low bargaining power face increased risk of domestic violence upon entering the labor force. Other studies investigate the consequences of DV and show that violence against women is related to higher rates of female unemployment (Lloyd, 1997;

Lloyd and Taluc, 1999) and women working less hours (Meisel, Chandler, and Rienzi, 2003; Swanberg and Logan, 2005; Tolman and Wang, 2005). Other studies, on the contrary, find that spousal violence appears to lead to increased labor market participation (Farmer and Tiefenthaler, 2004) and more hours of work (Staggs and Riger, 2005). Studies in Latin America and the Caribbean are similarly inconclusive; some find that abused wives are more likely to work (Morrison and Orlando, 1999; Agüero, 2013), while others find that they more likely to exit the labor force (Rios-Avila and Canavire-Bacarreza, 2017).

In this paper, I estimate the relationship between reporting having experienced domestic violence (DV) and women's employment. Further, I explore the role of women's decision-making power in mediating this relationship.

The main contributions of this study are twofold. First, using household survey data, I show that the effect of DV on woman's employment is positive in Colombia and that this result persists after using the plausibly exogenous variation in the husband's childhood exposure to domestic violence as an instrumental variable for DV. Women victims of domestic violence may decide to stay away from home and seek employment more actively to reduce their vulnerability by improving their economic situation. My findings support this notion as reported spousal violence does not prevent women from being active in the labor force: Women who experience DV are 18.7 percentage points more likely to work than women who do not. I acknowledge that the husband's childhood experience of violence is not a perfect instrument because of some remaining concerns about its excludability. To check for the robustness of my results to potential violations of the exclusion restriction, I employ the test proposed Nevo and Rosen (2012). This test allows me to relax the exclusion restriction assumption and bound the estimates for the parameter on DV. I find that my IV estimate may be a lower bound of the actual effect

of DV on women's employment.

This paper also contributes to the literature on the economics of the family and on women's empowerment by exploring the role of women's decision-making power. Wives may need to increase their power within the relationship and gain control of their decisions to increase their ability to escape domestic violence or, at least, lessen its intensity. To provide an exploratory assessment of the role of decision-making power, I conduct three analyses. The first exercise consists of a mediation analysis with instrumental variables, a method recently proposed by Dippel et al. (2017). With this method, I am able to calculate the direct effect and indirect effects of DV on employment. I find suggestive evidence that willingness to divorce is mediating the positive relationship between DV and employment. Second, I study the relationship between DV, employment and initial bargaining power of the wife to assess whether the effect of DV on employment differs by her education or age at marriage, which proxy for initial bargaining power. Third, I examine the relationship between employment and whether a woman can make spending decisions for herself and participate in household decision-making.

The rest of this paper is organized as follows: Section 2 describes the 2010 Colombian Demographic and Health Survey data. Section 3 explains the empirical methods and discusses the identification strategy. I present results in Section 4, and conduct robustness checks in Section 5. I explore the role of women's decision-making power and willingness to divorce in Section 6. Section 7 provides concluding remarks.

2 Data and Descriptive Statistics

The 2010 Colombian Demographic and Health Survey (DHS) provides demographic, socio-economic and health information for women and children and is representative of the population at the national level and for urban and rural areas in all regions and departments.[1] The DHS is a three-stage stratified cluster sample that covers all but the two most sparsely populated departments in Colombia. The DHS also provides detailed information on domestic violence for the female population aged 15 to 49 years who are currently married or living in a consensual union. The DHS selected 52,952 women for the domestic violence module, but women who had never been married or in a de facto union, as well as divorced and widowed women, were all excluded by the DHS team during this part of the survey.[2] Of the 33,728 women finally interviewed, 8,200 were married more than once and 25,528 were married only once. Given that the domestic violence module of the questionnaire refers to abuse by the current or previous male partner without distinction, I focus on the sub-sample of women who have been married or in a consensual union only once. This is because, in the data released by the DHS, it is not possible to obtain any information on previous marriages or consensual unions. The final sample includes 25,528 partnered women (8,180 are married and 17,348 are in a consensual union) who responded to the domestic violence module in the 2010 DHS. Although most of the women in the sample are not married, I refer to them as husband and wife, for convenience.

Domestic violence (DV) is measured using the modified Conflict Tactics Scale (CTS) (Straus, 1979; Straus et al., 1996). The DHS team elicits information on domestic vio-

[1] The DHS program is funded by the U.S. Agency for International Development (USAID).

[2] Another 1.06% of women were also excluded from the DHS because they could not be safely interviewed in private. Not being able to characterize this excluded part of the sample may be of concern if these women are affected the most by DV.

lence by administering this set of questions to one randomly selected woman in each household. The DHS team also obtains informed consent from the respondent at the beginning of the interview. The respondents are also reminded throughout the interview of the confidentiality of their responses.

I use one dummy variable for reported DV. "Physical DV", indicates whether the woman experienced physical spousal abuse in the past 12 months. That is, whether a husband: (1) Pushed or shook or threw something at her; (2) Slapped her; (3) Punched her with fist or something harmful; (4) Kicked or dragged her; (5) Tried to strangle or burn her; (6) Threatened her with knife/gun or other weapon; (7) Attacked her with knife/gun or other weapon; (8) Physically forced sex when not wanted; or (9) Bit her.

In the sample, about 19.3% of women reported physical/sexual abuse[3] in the past 12 months. This survey is also informative of intergenerational events of domestic violence. Although no information is reported for whether the husband's father beat his mother, about 33.5% of wives report their male partners were mistreated during childhood.

Table 1 reports summary statistics for the dependent and explanatory variables used in this study. Although the DHS is not a comprehensive labor force survey, it collects data on the labor market status of women by inquiring about the following: (1) Current work status (including work in own and family-owned businesses); (2) Work status in the past 12 months if not currently working; and (3) Whether the woman has ever worked if she did not work in the past 12 months. In this sample, about 69% of wives are currently working or worked at least one month in the 12 months prior to the survey, and about 12% had never worked. For this study, I focus on the woman's *work status now and in the past 12 months.* Unfortunately, it is not possible to determine from the DHS data the

[3]About 5% of the women in the sample were sexually abused.

timing of employment and violence: it is unknown whether the woman was working before the first event of DV or whether she started to work after being abused.

3 Empirical Framework

3.1 The Equation of Interest

The first contribution of this paper lies in the estimation of the impact of domestic violence on women's employment. This section discusses the equations to be estimated and the identification strategy used in an attempt to provide an unbiased estimate of the relationship between women's employment and DV.

Let L_{ir} be a dummy variable that indicates whether a woman is currently working or worked in the past 12 months. The first equation to be estimated in this paper is:

$$L_{ir} = \alpha + \mathbf{X'_{ir}}\mathbf{\Phi} + \beta \cdot DV_{ir} + \theta_r + \epsilon_{ir} \tag{1}$$

where the subscripts denote individual i in department r.[4] DV_{ir} is a dummy variable that indicates whether the woman reported being a victim of DV in the past 12 months; $\mathbf{X_{ir}}$ is a vector of individual and spousal characteristics including wife's and husband's age and educational attainment, wife's ethnicity, husband's work status, quantiles from a wealth index, and a dummy for urban residence. Other variables in $\mathbf{X_{ir}}$ include an indicator for whether the husband consumes alcohol. The θ_r term denotes department fixed effects that are included to address potential bias due to unobserved heterogeneity

[4]Departments are the first administrative division in Colombia. There are 32 departments, including the capital city of Bogota.

across departments. The ϵ_{ir} term is an error term with mean zero. If DV is exogenous with respect to employment, the estimate of β represents the average treatment effect (ATE) of DV on women's employment status.

Because some of the husband's information could be missing, I also include two dummy variables indicating whether his education or his work status are unknown to the wife. It cannot be assumed that the missing information on the husband is unrelated to his wife's employment status. Therefore, I include these missing indicators as regular controls in both the first and second stage equations.

I estimate Equation (1), weighting each observation with the associated probability weights provided in the data. Given the binary nature of the dependent variable, my use of OLS means that every equation estimated in this paper is a linear probability model (LPM). In estimating a LPM rather than a logit or a probit model, I follow the recommendations of Angrist and Pischke (2008). The primary benefits of using a LPM are: (i) LPM does not rely on distributional assumptions required by the logit and probit specifications; and (ii) LPM does a much better job than probit models at handling a large number of fixed effects. The primary drawback to using a LPM is that it produces errors that are heteroscedastic. I use robust Huber-White standard errors in all estimations in order to address this concern. These standard errors are further clustered at the primary sampling unit level,[5] given the sampling scheme, to account for further sources of heteroscedasticity within sampling units.

The primary objective of this paper is to assess whether DV has an impact on women's employment, as discussed in the introduction. Since DV is likely endogenous to a

[5]Primary sampling units (PSU) are the first stage of selection in a multi-stage sampling procedure. In the DHS data, these units typically correspond to an enumeration area or a segment of an enumeration area. In this sample, there are 3,965 PSUs.

woman's employment, the next section discusses the identification strategy used in this paper.

3.2 Identification Strategy

DV is unlikely to be exogenous in Equation (1). Three sources of endogeneity are of particular concern. The first source is the potential for *reverse causality* or *simultaneity*: an improvement in a wife's employment opportunities or an increase in her labor income may lead her husband to inflict violence on her. The second source is *unobserved heterogeneity* or *non-random selection* into violent relationships based on unobservable characteristics. Unobserved variables such as social norms or characteristics of the wife and her partner can influence both domestic violence and female employment, so that DV and employment can be correlated even if the former does not have a causal effect on the latter. For example, husbands' characteristics such as drug or alcohol use or involvement in crime may directly affect the wife's decisions to work and directly lead to DV. The third source of endogeneity is *measurement error*, which is particularly driven by under-reporting of incidents of domestic violence in survey data. Any of these sources of endogeneity will cause DV to be correlated with the error term in Equation (1).

The identification strategy used in this paper relies on the use of an instrumental variable (IV). To produce consistent estimates, this variable must be conditionally correlated with reported DV, but uncorrelated with the error term in Equation (1). The first assumption, that the IV is correlated with DV, can be ascertained using a test of the null hypothesis that the instrument has no explanatory power with respect to the endogenous variable. The result of this test is presented in section 4. The second assumption, or the exclusion restriction, requires that the IV affects women's employment

only through DV. This restriction is not directly testable but this section discusses its validity in this context.

The instrumental variable I use for reported DV is a dichotomous variable that indicates whether a woman reports that her husband was mistreated or regularly beaten by his parents or stepparents as a child. The identifying assumption is thus that husband's childhood experience of domestic violence is uncorrelated with ϵ_{ir} in Equation (1). The second-stage equation is:

$$L_{ir} = \alpha + \mathbf{X'_{ir}}\mathbf{\Phi} + \beta \cdot \widehat{DV_{ir}} + \theta_r + \epsilon_{ir} \tag{2}$$

where $\widehat{DV_{ir}}$ denotes the predicted probability of DV conditional on the instrument Z_{ir} and $\mathbf{X_{ir}}$, obtained from the first-stage regression of DV on the husband's childhood experience of domestic violence and the control variables included in Equation (2), which is given by:

$$DV_{ir} = \alpha_1 + \mathbf{X'_{ir}}\mathbf{\Pi} + \rho \cdot Z_{ir} + \varphi_r + \mu_{ir} \tag{3}$$

where Z_{ir} is a dichotomous variable for the husband's childhood experience of domestic violence, μ_{ir} is an error term with mean zero, and all other variables are defined as above.

If the instrument has conditional predictive power for DV and satisfies the exclusion restriction and the monotonicity assumption (which are discussed below), the IV estimate of the coefficient β is a local average treatment effect (LATE) of reported DV on women's employment, i.e., the increase in the probability of work (as measured by the dependent variable) due to DV for those couples for whom a husband being abused by his parents during childhood induces a change in DV. This is the treatment effect on the

group of "compliers". In this application, compliers are couples in which the husband's DV propensity is affected by his exposure to violence as a child. The compliers group is a subset of all couples, and it is impossible to determine whether the effect of DV estimated for this group is the same as that for the population as a whole.

The husband's childhood experience of domestic violence has predictive power for DV, and thus satisfies the "relevance" assumption in this setting, for various reasons. Children who are exposed to domestic violence have higher levels of internalizing (depression, anxiety) and externalizing (physical aggression) behaviors and post-traumatic stress disorder (Evans, Davies, and DiLillo, 2008; Graham-Bermann et al., 2012). Further, some studies suggest that childhood exposure to domestic violence becomes a risk factor for being a victim and/or perpetrator of violence later in life, both in developed (Whitfield et al., 2003) and developing countries (Martin et al., 2002). Previous studies for Colombia (Assaad, Friedemann-Sanchez, and Levison, 2016; Friedemann-Sánchez and Lovatón, 2012) show that a partner's experience of violence against him as a child is highly associated with the incidence of domestic violence in adulthood.

One argument for why the instrumental variable proposed in this paper is likely to satisfy the exclusion restriction is that it affects a husband's potential engagement in violent behavior long before the couple's formation, as supported by the studies on intergenerational transmission mentioned in the previous paragraph. Therefore, with the inclusion of appropriate controls for household socioeconomic characteristics, it is plausible that a husband's childhood experience of violence is uncorrelated with unobserved variables affecting the wife's current employment status. It is still possible that the correlation between Z_{ir} and ϵ_{ir} is non-zero due to the effect of assortative, endogenous matching, i.e., husbands and wives choose each other on the marriage market (Ackerberg and Botticini, 2002). I include in the regression various controls for the wife's

and husband's characteristics that are variables on which the matching may occur such as their education, their age and the occupation of the husband. The inclusion of these variables increases the likelihood that the exclusion restriction holds.

The estimated treatment effect could be different from the effect for the couples where the husband would be violent either way (the "always takers") or the couples where the husband does not commit DV whether exposed to violence as a child or not (the "never takers"). "Defiers" would be cases where the man turns out violent if he was not exposed to violence as a child, but if he were exposed he would be peaceful in his marriage. Perhaps being exposed to violence makes him commit to never being violent. The empirical evidence, however, suggests that the potential for a husband consciously choosing to avoid perpetuating violence as an adult, despite being abused as a child, may be ruled out in most cases (Whitfield et al., 2003; Kishor and Johnson, 2004; Flake and Forste, 2006; Friedemann-Sánchez and Lovatón, 2012). This evidence further suggests that I can rule out the existence of "defiers" and that the monotonicity assumption is likely to be satisfied.[6] If, however, the effect of the IV on the endogenous regressor is non-monotonic, one must assume homogenous treatment effects (i.e., the treatment effect is the same for everyone) and the LATE interpretation of the IV estimate on β may no longer be valid. In such a case, one cannot guarantee that IV estimates a weighted average of the underlying causal effects of the affected group.

Though instrumenting for DV using the husband's childhood experience of domestic violence can mitigate simultaneity as a source of endogeneity, it does not fully address endogeneity coming from measurement error in reports of domestic violence. In this regard, note that throughout my analysis, I am careful to talk of the relationship between

[6]The instrument may have no effect on some individuals, but all those who are affected are affected in the same way, so that all individuals who change their treatment status as a result of a change in the instrument either get all shifted into treatment, or get all shifted out of treatment.

reported DV, as opposed to actual DV, and employment status.

4 Results

The main empirical results are reported in Table 2. Demographic characteristics such as age, ethnicity, educational attainment, household wealth,[7] department of residence and urban residence are included to capture earnings potential that may affect a woman's decision to work. I include fixed effects for the department of residence and a dummy for urban residence to control for different labor demand conditions. Husband's characteristics (age, educational attainment, work status, and whether he drinks alcohol) are also included to control for other potential factors that impact employment by affecting the costs and benefits of working relative to not working.

As a baseline, I first estimate the probability that a woman works, treating DV as fully exogenous, using a linear probability model (LPM) to estimate Equation (1). The OLS results from the linear probability model are presented in column 1 of Table 2. I find that being physically abused by a husband in the past 12 months appears to increase the likelihood that a wife currently works or has worked in the past 12 months by 5.7 percentage points. Because of the potential endogeneity problems discussed in section 3, these results should be considered to be (conditional) associations between women's employment and DV, and so they cannot be given a causal interpretation.

In an effort to provide an unbiased estimate of the impact of DV on women's employment, I rely on two-stage least squares estimation. For this, husband's childhood experience of domestic abuse is used to instrument DV. As with the LPM, I control

[7]Household wealth is measured with the DHS wealth index readily available in the dataset and calculated using the methodology of Filmer and Pritchett (2001)

for wife's and husband's characteristics, and cluster the standard errors at the primary sampling unit level. Instrumental variable results from the estimation of Equation (2) suggest that DV is significant and positively affects women's employment (see Table 2). The experience of any event of spousal violence increases the likelihood of work by 18.7 percentage points, and this estimate is significant at the 1% level.

Results from regressing the indicator for DV on the instrument and various controls, the first stage of the 2SLS analysis, are shown in Table 4. Having a male partner who was abused by his parents as a child increases the probability of experiencing DV by 12.5 percentage points.

This estimation strategy allows me to conduct a number of tests on the validity of the instrument. The first test is a diagnostic regression of the dependent variable on the IV as the only regressor, suggested by Angrist and Pischke (2008), to provide evidence in favor of a relationship flowing from the husband's childhood experience of domestic abuse to women's employment. Table 3 presents the results from such a reduced-form regression and suggests that the relationship is positive and statistically significant. The second test is whether the instrument has sufficient explanatory power in the first stage equation. The F-statistics for the instrument in the first stage for any experience of DV, shown in Table 4, is well above the threshold level of 10 for an instrument not to be considered weak.

For an additional test of the strength of the instrument, I use the procedure proposed by Montiel Olea and Pflueger (2013), which is appropriate to test for weak instruments with one endogenous regressor. This test also allows for errors that are not conditionally homoscedastic and not serially uncorrelated. Upon testing the instrument in the regression where any experience of DV is the endogenous variable, I obtain an effective F-stat

of 342.1 with a bandwidth threshold of 10% and a 2SLS critical value of 23.1. These test results suggest rejection of the null hypothesis of weak instruments.

These IV estimates of the effect of DV on women's employment are much higher than the OLS estimates. When considering the magnitude of these results, it is important to keep in mind that IV estimates a local average treatment effect (LATE). This is the effect of DV on the likelihood of employment for wives in couples in which the husband's DV propensity is affected by his exposure to violence as a child.

5 Sensitivity to Potential Violations of the Exogeneity of Husband's Childhood Exposure to Domestic Violence

The instrument, husband's childhood experience of violence, may fail to satisfy the exclusion restriction because the husband's experience with violence in childhood may be directly correlated with the wife's labor status in other ways, mainly via *assortative matching*. Assortative matching does not have to work through a direct impact of husband's childhood experiences on his wife's employment. It could work through his choice of wife, i.e., a man with certain childhood experiences chooses a wife who has certain personality traits that have an effect on her employment. This constitutes a potential threat to the exclusion restriction assumption upon which the validity of the instrument depends. The regression, however, includes a variety of husband's and wife's observable characteristics that will partly control for assortative matching. These variables are: age; ethnicity; educational attainment; and husband's occupation. The inclusion of controls for household socioeconomic status also support the exclusion of the husband's childhood experience of violence from the wife's labor status equation.

In this section, I implement the Imperfect Instrumental Variable approach developed by Nevo and Rosen (2012) to relax the exclusion restriction assumption and bound the estimates for the parameter of interest.

The method of Nevo and Rosen (2012) relies on two critical assumptions. First, the correlations between the endogenous regressor and the error term in Equation (2) and between the instrument and the error term in the same equation have the same sign. This implies that

$$\rho_{Z,\epsilon} \cdot \rho_{DV,\epsilon} \geq 0 \tag{4}$$

where $\rho_{Z,\epsilon}$ denotes the correlation between the instrument, Z, and the error term ϵ, and $\rho_{DV,\epsilon}$ the correlation between DV and the error term.

The second assumption is that the correlation between the instrument and the error term is less strong in absolute terms than the correlation between the endogenous variable and the error term. This last assumption weakens the usual assumptions for instrumental variables which would require the correlation between the instrument and the error term to be zero. This is,

$$|\rho_{DV,\epsilon}| \geq |\rho_{Z,\epsilon}| \tag{5}$$

In my application, the above assumptions are likely to be satisfied. Unobserved characteristics of the husband and the wife influence women's employment through positive assortative matching. The assortative matching literature suggests that when choosing a spouse individuals look for partners who share common productivity traits, work status or earnings potential (Lam, 1988; Kalmijn, 1994; Jepsen and Jepsen, 2002). Some of the studies mentioned in section 3 suggest that individuals abused in childhood may

be more likely to exhibit adverse psychosocial outcomes in adulthood, which are unobserved but may be negatively correlated with the woman's labor productivity or propensity to work. The potential for positive assortative matching then suggests that the correlation between the endogenous regressor and the error term is likely negative, as well as the correlation between the instrument and the error term.

Since I am controlling for a large number of factors affecting employment, I expect the correlation between the error and the instrument to be negligible and at least smaller than the correlation between the endogenous regressor and the error term. When this condition is satisfied, one can estimate the lower bound of the parameter estimate using a generated instrumental variable suggested in Nevo and Rosen (2012). In my case, the generated instrumental variable is defined as

$$V(\lambda) = \sigma_{DV} \times Z - \lambda \times \sigma_Z \times DV \tag{6}$$

where σ_{DV} and σ_Z denote standard deviations. The λ term denotes the ratio between the correlations between the instrument and the endogenous regressor with the error term: $\lambda = \frac{\rho_{Z,\epsilon}}{\rho_{DV,\epsilon}}$. This term is in principle unknown; however, Nevo and Rosen (2012) show that, under the above assumptions, its value lies between 0 and 1. With $\lambda = 1$ one has the worst case in which the IV is as endogenous as the endogenous regressor. In contrast, when $\lambda = 0$, one has the IV valid case.

The first stage estimates show that the instrument has a positive effect on the endogenous regressor, DV. If the first and second assumptions hold and, as in my case, the covariance between the endogenous variable and the instruments is positive, Nevo and Rosen (2012) show that the bound for the true parameter value is one-sided.[8] The

[8]If the correlation between the instrument and the endogenous regressor were negative, then the true parameter would be bounded between the IV estimate with the Nevo-Rosen instrument and the original

estimate obtained using the imperfect instrumental variable proposed in Equation (6) will be a lower bound of the true parameter estimate of the effect of DV on female employment. That is,

$$\beta \geq \max\{\beta^{IV}_{V(\lambda=1)}, \beta^{IV}_{Z}\} \tag{7}$$

Controlling for other covariates in IV regressions is often important because the assumption of exogeneity may hold only after conditioning on all exogenous variables. In the Nevo and Rosen approach, the assumptions on the correlation structure do not change for the more general version of the model where there are additional covariates. To estimate the lower bound of the DV effect using covariates, I also use 2SLS. Results with covariates, which are displayed in Table 5, do not change drastically. The lower bound for the effect of DV on employment is 0.18. That is, the Nevo-Rosen bounds for the effect of physical DV on employment are $[0.18, \infty)$. When I relax the exogeneity assumption, the effect of DV on women's employment is still positive and larger than the effect estimated with OLS.

6 The Role of Women's Decision-Making Power

In this section, I study the role of women's decision-making power in explaining the positive effect of DV on women's work. In order to increase their ability to escape domestic violence, wives may need to increase their power within the relationship and gain control of their decisions and earnings. This behavior is consistent with the game-theoretic model of Farmer and Tiefenthaler (2004), which includes a threat point that

IV estimate.

is increasing in a woman's income and other outside opportunities.[9] To achieve this, abused women may be more likely to work.

In order to provide an exploratory assessment of the role of women's decision-making power, I do three things. First, I use mediation analysis to assess whether a woman's willingness to separate is a possible mechanism. If a woman's decision-making power comes from increases in her outside option, then her willingness to leave an abusive relationship may make her work more or enter the labor force. Second, I study the relationship between DV, employment and initial bargaining power of the wife to assess whether the effect of DV on employment differs by her age at marriage or education, which proxy for initial bargaining power. Third, I examine the relationship between employment and whether a woman can make spending decisions for herself and participate more in household decision-making.

6.1 Testing a Potential Mediator

The aim of this section is to identify the mechanism underlying the effect of DV on employment. In explaining why the effect of DV on employment may be positive, Tolman and Wang (2005) suggest that paid work empowers women to be economically autonomous and to have the power to leave abusive relationships they would otherwise be dependent upon. Abused women may decide to stay with their abusers because they do not have the economic resources to survive without them. By working, however, they are able to gain control over money and to acquire the financial resources they need to be able to escape the violence. This behavior is consistent with evidence documented in the psychology literature. Qualitative studies show that women see in employment a

[9] If an increase in a woman's threat point increases her chances of leaving and lowers the violence when she stays, then she would seek employment to improve her alternatives.

way to exit abusive or coercive relationships (Lloyd, 1997).

A possible mediator is a woman's willingness to separate. Because they want to leave, abused women are more likely to work to be able to leave their abusive partners. To assess this explanation, I check how much of my baseline results can be explained by willingness to separate. I do so in two ways. First, I include the mediator as a covariate in the 2SLS specification, along with DV, the treatment of interest. This analysis is shown in Table 6. The coefficient on DV is no longer statistically significant at the 5% level, suggesting that its direct effect may operate through willingness to separate.

To gain a deeper understanding of the mechanism, I also use a causal mediation analysis. Imai et al. (2011) explain that the goal of this analysis is to decompose the causal effect of (treatment) DV into an indirect effect, which represents the hypothesized causal mechanism, and a direct effect, which represents all the other mechanisms. My hypothesized causal mechanism is woman's willingness to separate. One problem with using a woman's willingness to separate in a causal mediation approach, however, is that it violates the key assumption of no *intermediate confounders*, which are consequences of DV that also affect the intermediate outcome (willingness to divorce) and final outcome (employment). To address this concern, I employ a method recently developed by Dippel et al. (2017) that allows the identification of causal direct effects in the face of intermediate confounders in an instrumental variables setting.

Dippel et al. (2017) propose an instrumental variables framework to gauge: (i) the causal effect of the endogenous treatment on both the intermediate and the final outcome variable; and (ii) the causal effect of the intermediate variable on the final outcome. They show that the same instrumental variable also provides exogenous variation that is useful to evaluate the causal effect of intermediate outcomes on final outcomes.

Let T, M, Z and Y denote treatment, mediator, instrument and outcome, respectively. The mediation model of Dippel et al. (2017) consists of four observed variables T, M, and Y and four statistically independent error terms ϵ_T, ϵ_M, ϵ_Z and ϵ_Y. The total treatment effect (i.e., average effect of T on Y) is the sum of a direct effect and an indirect effect. The direct effect is the effect of T on Y when the distribution of M is fixed at some counterfactual value $M(t)$, which is generated by fixing the argument T of the distribution function of M to a value t in the support of T. The indirect effect is the effect of T on Y induced by a change in the distribution of M.

Treatment T and mediator M are endogenous in the mediation model, but instrument Z allows for the identification of causal effects provided that three exclusion restrictions are satisfied:

$$\text{for T on Y:} \quad Z \not\perp\!\!\!\perp T \quad \text{and} \quad Z \perp\!\!\!\perp Y(t) \tag{8}$$

$$\text{for T on M:} \quad Z \not\perp\!\!\!\perp T \quad \text{and} \quad Z \perp\!\!\!\perp M(t) \tag{9}$$

$$\text{for M on Y:} \quad Z \not\perp\!\!\!\perp M|T \quad \text{and} \quad Z \perp\!\!\!\perp Y(m)|T \tag{10}$$

Equations 8 and 9 imply that Z can be used to evaluate the causal effect on T on Y or M by applying standard IV techniques. Equation 10 implies that instrument Z can be used to evaluate the causal relation of M on Y if (and only if) conditioned on T.

Dippel et al. (2017) show that, under linearity, the following are the (second stage) equations of interest:

$$Y = \Gamma^Y + \Gamma^Y_T \cdot T + \epsilon^Y \tag{11}$$

$$M = \Gamma^M + \Gamma^M_T \cdot T + \epsilon^M \tag{12}$$

$$Y = \Gamma^{Y|T} + \Gamma^{Y|T}_M \cdot M + \Gamma^{Y|T}_T \cdot T + \epsilon^{Y|T} \tag{13}$$

Equation 11 gives the total effect of T on Y, Λ_T^Y, which is identified by $\widehat{\Gamma_T^Y}$. Equation 12 evaluates the treatment effect on the mediator, Λ_T^M, which is identified by $\widehat{\Gamma_T^M}$. Equation 13 allows the identification of the direct effect of T on Y, Π_T^Y (identified by $\widehat{\Gamma_T^{Y|T}}$), while the indirect (mediated) effect is given by the product of multiplying Π_M^Y (identified by $\widehat{\Gamma_M^{Y|T}}$) by Λ_T^M (identified by $\widehat{\Gamma_T^{Y|T}}$).

Dippel et al. (2017) further show that this model specification implies the following relationship among the identified parameters:

$$\Lambda_T^Y = \Pi_T^Y + \Pi_M^Y \cdot \Lambda_T^M \tag{14}$$

Estimates from this mediation analysis are reported in Table 7. The implied magnitude of the indirect effect, $\widehat{\Gamma_M^{Y|T}} \cdot \widehat{\Gamma_T^M}$, is 0.16 ($= 1.30 \times 0.12$). This effect is statistically significant: using Generalized Method of Moments (GMM) estimations, I find a z-statistic of 1.7 and a p-value of 0.09. The direct effect of DV on women's work that is unrelated to willingness to separate is given by estimate $\widehat{\Gamma_T^{Y|T}}$ reported in the same table. This estimated effect of -0.08 implies that the total effect mostly comes from the indirect effect.

My mediation analysis thus shows that the total effect of DV on employment consists of a large effect that runs through the desire to leave an abusive relationship and a moderating direct effect that runs through other channels. The interpretations above are only valid if the model assumptions hold. These assumptions can be tested using Equation 14. The null hypothesis for the validity of the hypothesized causal links is:

$$H_0 : \Gamma_T^Y = \Gamma_T^{Y|T} + \Gamma_M^{Y|T} \cdot \Gamma_T^M \tag{15}$$

If one fails to reject this hypothesis, that is equivalent to say that the causal mechanism behind the effect of DV on employment has been identified. Using GMM, I find that the p-value is very close to 1, which suggests that the causal model defined by Equations 11 to 13 is the correct one.

6.2 DV, Employment and Initial Bargaining Power of the Wife

The relationship between DV and employment may vary with the wife's age, education and age at marriage, which are variables that suggest the initial bargaining power of the wife upon entering the labor force, as shown in the study of Heath (2014). In order to assess whether the effect of DV on employment differs by the initial bargaining power of the wife, I estimate OLS regressions, because of the potential endogeneity of the initial bargaining power variables. In these regressions, I include interactions of the DV variable with the variables for age at marriage and years of education, along with the covariates used in previous sections.

The first column of Table 8 shows that a one year increase in the age at marriage is associated with a statistically significant 0.9 percentage-point increase in the probability of employment. Among abused women, compared to those who have not been abused, the increase in the probability of employment is negligible. Similarly, column 4 suggests that an additional year of education is associated with a statistically significant 2.5 percentage-point increase in the probability that a woman has worked in the past 12 months, and such an increase is somewhat smaller for abused women. These results suggest that the correlation between DV and employment is positive, although the effect of DV may be lessened among abused women with higher initial bargaining power.

The association between DV and employment may be lessened among women with

higher initial bargaining power due to marriage matching. To investigate this channel, I include husband's education or his age relative to his wife as controls. If marriage matching changes the relationship between DV, employment and decision-making power, then the inclusion of the variables for difference in age or difference in years of education will decrease the magnitude of the interaction term between the wife's education or age at marriage and DV. Results in columns 2 and 4 in Table 8, however, show that conditional on the husband's characteristics, the relationship between a wife's initial bargaining power, DV and employment remain almost identical. That is, the effect of a woman's age at marriage and education on bargaining power may not depend on her husband's age or education. This result is also observed when characteristics of the wife and her husband are included as controls, as displayed in columns 3 and 6 in the same table.

6.3 DV, Employment and Wife's Decision-Making Power

Instrumental theories of domestic violence suggest that men use violence to counteract the increase in decision-making power that women get upon working (Eswaran and Malhotra, 2011), but women with sufficiently high decision-making power are more able to escape abusive marriages and thus do not face such increase in violence (Heath, 2014).[10] Although I am not able to observe transitions in and out of the labor force and the timing of violence relative to labor market decisions, I provide suggestive evidence

[10] Heath (2014) provides a brief summary of the predominant economic and social theories of domestic violence. These theories are broadly categorized between theories of expressive violence and of instrumental violence. In expressive violence theories, "male backlash" occurs in response to improvements in a woman's economic opportunities. A husband who feels less economically empowered than his wife may resort to violence to reassert his identity as the most powerful member of the household. In instrumental violence theories, domestic violence is a tool used by husbands to control household resources or the behavior of their wives. These theories usually employ household bargaining models, wherein a woman's outside option is a key determinant of bargaining power and the actions taken by the household members. Thus, in situations where the outside option improves sufficiently, an abused woman may be better able to leave the abusive relationship.

on how employment may have affected a woman's decision-making power.

The measures of decision-making power that I use are: (i) whether a wife has the final say in own health care; (ii) whether the wife has a final say in large household purchases; and (iii) whether the wife has a final say in purchases for daily needs. To construct these measures, I use the wife's reports of who makes the decisions in the household. Specifically, I assess a woman's decision-making ability using her answer to the question: "Who has the final say in [X] in your household?". If the woman alone has the final say, then each of the measures above equals one, and zero otherwise.

Initial bargaining power seems to play an important role in determining the employment effects on woman's decision-making power. Heath (2014) shows that women with higher bargaining power before entering the labor force are less likely to face domestic violence upon entering the labor force. In order to assess how the employment effects may differ by a wife's initial bargaining power, I also include the wife's age at marriage and education, and interactions of these with employment, as controls in the regression of employment on the decision-making power measures.

Previous evidence for Colombia suggests that women working in the cut-flower industry, via formal jobs, increased their self-esteem and gained higher decision-making power within the household Friedemann-Sánchez (2006). My results are consistent with these findings. Results in Tables 9 and 10 suggest that employment is associated with higher decision-making power. The results also show that education is positively correlated with higher decision-making power. Notably, results in Table 10 suggest that employment is associated with less decision-making power in women with more education (coefficient on interaction term is negative).[11] These results suggest that employment

[11]The point estimates on the interaction between employment and education do not change drastically after controlling for husband's characteristics such as his age and education or after adding an interaction

and education do not interact positively in raising a woman's decision-making power.

7 Concluding Remarks

This paper estimates the effect of reported experience of domestic violence on women's employment. An econometric estimation that ignores the potential endogeneity problem between DV and employment leads to biased estimates of the effect of DV on employment. Two sources of endogeneity are of particular concern: reverse causality and unobserved heterogeneity. In an attempt to deal with these sources of endogeneity, I employ an instrumental variables approach. I use as an instrument for DV a dummy variable that indicates whether a husband was mistreated by his parents as a child. I find that any event of domestic violence is associated with a 18.7 percentage-point increase in the likelihood of employment. The results suggest that the incidence of DV does not restrain women from being active in the labor force.

The evidence presented in this paper supports the hypothesis that women may behave strategically in their labor market decision-making and seek employment to improve their outside alternatives when faced with domestic violence, as suggested by Farmer and Tiefenthaler (2004). Women with higher initial bargaining power (proxied by age at marriage and education) are more likely to work, and employed women also seem to enjoy higher decision-making power within the household. Upon exploring whether a woman's decision-making power mediates the positive impact of DV on employment, using the mediation analysis with IV method of Dippel et al. (2017), I find suggestive evidence that willingness to divorce is mediating the positive relationship between DV and employment.

term of employment with husband's education.

While the wife's partner's childhood experience of violence may not be a perfect instrument because of some remaining concerns about its excludability and monotonicity, it provides an alternative way to control for selection. If the instrument violates the exclusion restriction, its effect would be to bias the effect of DV on women's work. That is, the effect would capture both any effect of DV itself and also effects operating through pathways relating to the husband's direct impact on the wife due to marriage matching, for instance.

That the DV measure used in this paper is self-reported posits another problem. Although the DHS program attempts to minimize the underreporting and measurement error of this variable by "building rapport with the respondent, ensuring privacy, providing the respondent with multiple opportunities for disclosure [...] not only by asking them many different times about any experience of violence, but also by asking them about many different forms of violence" (Kishor and Johnson, 2004), my estimates of the effect of DV on employment should be interpreted cautiously. Still, despite the number of caveats to the results presented, this study sheds new light on the impact of domestic violence on female labor market decisions.

My findings may suggest some important policy implications. That women victims of DV are more likely to work suggests that they may benefit from counseling and legal help inside and outside the workplace. This is particularly important since previous studies (Farmer and Tiefenthaler, 2004; Swanberg and Logan, 2005) suggest that DV has negative effects on labor productivity, absenteeism and tardiness, as well as turnover. Support from the workplace in combination with the provision of social services, such women's shelters and job training programs, could help reduce the economic insecurity faced by the victims of domestic violence and support their efforts to leave abusive relationships.

Possibilities for future research include tackling the remaining methodological issues using administrative data to study the effect of DV on the transitions in and out of the labor market, which also requires being able to observe the full labor history of a woman.

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A Tables

Table 1: Characteristics of Women in Sample (N=25,528)

Variable	All Women	DV Victims	Non-Victims	Difference in means	P-value for t-test of diff in means
Work in past 12 months	0.690	0.756	0.674	0.082	0.000
Quintile 1 of household wealth	0.200	0.189	0.203	-0.014	0.073
Quintile 2 of household wealth	0.200	0.215	0.196	0.019	0.022
Quintile 3 of household wealth	0.200	0.231	0.193	0.038	0.000
Quintile 4 of household wealth	0.202	0.206	0.202	0.004	0.603
Quintile 5 of household wealth	0.197	0.159	0.206	-0.047	0.000
Urban residence	0.766	0.797	0.759	0.038	0.000
Age of wife	33.642	31.820	34.079	-2.259	0.000
Wife's Ethnicity: No ethnicity	0.858	0.847	0.860	-0.014	0.055
Wife's Ethnicity: Indigenous	0.043	0.046	0.042	0.003	0.367
Wife's Ethnicity: Afro-Colombian	0.099	0.107	0.096	0.010	0.084
Wife's Ethnicity: Other	0.001	0.001	0.001	-0.000	0.725
Wife's education	9.090	8.699	9.184	-0.485	0.000
Wife's age at marriage	20.864	19.716	21.140	-1.424	0.000
Any children aged 6+ at home	0.590	0.573	0.595	-0.021	0.029
Any children aged 5 or less at home	0.397	0.429	0.390	0.039	0.000
Wife currently pregnant	0.044	0.036	0.046	-0.010	0.005
Any childbirth in past year	0.084	0.079	0.085	-0.006	0.280
Wife has final say on own health care	0.791	0.844	0.779	0.065	0.000
Wife has final say on making large household purchases	0.298	0.397	0.274	0.123	0.000
Wife has final say on making household purchases for daily needs	0.456	0.508	0.444	0.064	0.000
Wife has final say on various dimmensions	0.844	0.882	0.835	0.047	0.000
Considered separating from husband in past 12 months	0.254	0.696	0.178	0.519	0.000
Husband's age	38.194	35.877	38.592	-2.715	0.000
Husband's education	10.818	10.450	10.906	-0.457	0.000
Husband currently working	0.929	0.912	0.932	-0.021	0.002
Husband drinks alcohol	0.663	0.783	0.634	0.149	0.000
Husband mistreated by parents in childhood	0.335	0.530	0.291	0.239	0.000

Source: 2010 Colombian DHS

Table 2: 2SLS Estimates for the Likelihood of Women's Employment

	OLS	
	(1)	(2)
Dependent Variable: Work in past 12 months		
Physical DV in past 12 months	0.057***	0.187***
	(0.011)	(0.070)
Urban Residence	0.053***	0.044***
	(0.015)	(0.016)
Quintile 2 of household wealth	0.081***	0.079***
	(0.015)	(0.017)
Quintile 3 of household wealth	0.090***	0.093***
	(0.019)	(0.021)
Quintile 4 of household wealth	0.096***	0.097***
	(0.020)	(0.022)
Quintile 5 of household wealth	0.083***	0.088***
	(0.022)	(0.023)
Wife's Age Group: 26-35	0.110***	0.109***
	(0.012)	(0.014)
Wife's Age Group: 36-49	0.145***	0.146***
	(0.014)	(0.017)
Wife's Ethnicity: Indigenous	0.075***	0.056**
	(0.021)	(0.022)
Wife's Ethnicity: Afro-Colombian	0.021	0.021
	(0.015)	(0.015)
Wife's Ethnicity: Other	0.219**	0.261**
	(0.109)	(0.117)
Wife's Education: Incomplete primary	0.021	0.026
	(0.035)	(0.038)
Wife's Education: Complete primary	0.040	0.047
	(0.034)	(0.038)
Wife's Education: Incomplete secondary	0.037	0.046
	(0.034)	(0.037)
Wife's Education: Complete secondary	0.107***	0.112***
	(0.034)	(0.038)
Wife's Education: Higher	0.245***	0.253***
	(0.035)	(0.039)
Husband's Age Group: 25-35	0.014	0.019
	(0.016)	(0.017)
Husband's Age Group: 35-49	0.007	0.013
	(0.018)	(0.020)
Husband's Age Group: 50-65	-0.045**	-0.033
	(0.022)	(0.024)
Husband's Age Group: 65+	-0.011	-0.003
	(0.050)	(0.054)
Husband's Age Group: Unknown	0.196***	0.179***
	(0.019)	(0.024)

Husband's Education: Incomplete primary	0.018	0.006
	(0.027)	(0.029)
Husband's Education: Complete primary	0.039	0.027
	(0.027)	(0.029)
Husband's Education: Incomplete secondary	0.035	0.029
	(0.026)	(0.029)
Husband's Education: Complete secondary	0.044	0.032
	(0.032)	(0.034)
Husband's Education: Higher	0.051*	0.050
	(0.028)	(0.031)
Husband's Education: Unknown	0.006	-0.013
	(0.048)	(0.054)
Husband currently working	-0.035**	-0.028*
	(0.015)	(0.016)
Husband drinks alcohol	0.025***	0.015
	(0.009)	(0.011)
Constant	0.210***	0.196***
	(0.046)	(0.050)
Mean of Dependent Variable	0.682	0.682
First-stage F-stat		253.299
Montiel-Pflueger F-stat		342.1
R-squared		0.098
Department Fixed Effects	Yes	Yes
Household's Controls	Yes	Yes
Wife's Controls	Yes	Yes
Husband's Controls	Yes	Yes
Observations	21,345	19,085

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS

Table 3: OLS Estimation Results for the Reduced Form Relationship between Women's Work and Husband's Childhood Exposure to Domestic Violence

	(1)
Dependent Variable: Work in past 12 months	
Husband mistreated by parents in childhood	0.017*
	(0.009)
Constant	0.659***
	(0.006)
R-squared	0.000
Observations	19,085

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS

Table 4: First-Stage Estimates for the Likelihood of Domestic Violence

	(1)
Dependent Variable: Victim of DV in past 12 months	
Husband mistreated by parents in childhood	0.125***
	(0.008)
Constant	0.154***
	(0.034)
Mean of Dependent Variable	0.193
First-Stage F-stat	253.299
Montiel-Pflueger F-stat	342.049
Department Fixed Effects	Yes
Household's Controls	Yes
Wife's Controls	Yes
Husband's Controls	Yes
Observations	19,085

Table 5: 2SLS Estimates for Women's Employment: Nevo-Rosen Approach with Covariates

	OLS	2SLS: Imperfect IV	2SLS: Nevo-Rosen IV
	(1)	(2)	(3)
Dependent Variable: Work in past 12 months			
Physical DV in past 12 months	0.057***	0.187***	0.023
	(0.011)	(0.070)	(0.015)
Mean of Dependent Variable	0.682	0.682	0.682
Department Fixed Effects	Yes	Yes	Yes
Household's Controls	Yes	Yes	Yes
Wife's Controls	Yes	Yes	Yes
Husband's Controls	Yes	Yes	Yes
Observations	21,345	19,085	19,085

Note: Imperfect Instrument: Husband's Childhood Experience of Domestic Violence.
Standard errors in parenthesis. Clustered at the PSU level for OLS and IIV models.
Bootstrap (200 reps.) for Rosen-Nevo instrument.
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS
Female's characteristics: age, years of education, ethnicity.
Husband's characteristics: age, years of education, work status, alcohol consumption.
Household characteristics: wealth quintile group, urban/rural area.

Table 6: 2SLS Estimates: Effect of DV on Work Net the Effect of Willingness to Separate

Dependent Variable: Work in past 12 months	(1)	(2)
Physical DV in past 12 months	0.177**	0.160
	(0.076)	(0.128)
Considered separating from husband in past 12 months		0.013
		(0.042)
Department Fixed Effects	Yes	Yes
Wife controls	Yes	Yes
Household controls	Yes	Yes
Husband controls	Yes	Yes
R-squared	0.084	0.086
Observations	17,652	17,652

Standard errors in parenthesis, clustered at the PSU level.
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS

Table 7: Effect of Mediator and DV on Work

	(1)
Equation for the Total Effect	
Dependent Variable: Work past 12 months	
Physical DV in past 12 months	0.152**
	(0.060)
Equation for the Treatment Effect on Mediator	
Dependent Variable: Willingness to Separate past 12 months	
Physical DV	1.308***
	(0.070)
Equation for Direct and Indirect Effects	
Dependent Variable: Work past 12 months	
Physical DV in past 12 months	-0.008
	(0.037)
Willingness to Separate in past 12 months	0.122*
	(0.072)
Department Fixed Effects	Yes
Household Controls	Yes
Wife Controls	Yes
Husband Controls	Yes
Observations	17,652

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
No sampling weights were used in these calculations.
Source: 2010 Colombian DHS
Female's characteristics: age, years of education, ethnicity.
Husband's characteristics: age, years of education, work status, alcohol consumption.
Household characteristics: wealth quintile group, urban/rural area.

Table 8: OLS Estimates: Relationship between Wife and Husband Characteristics, DV and Employment

Dependent Variable: Wife worked in past 12 months	(1)	(2)	(3)	(4)	(5)	(6)
Physical DV in past 12 months	0.132***	0.107*	0.079	0.137***	0.131***	0.089*
	(0.043)	(0.063)	(0.064)	(0.039)	(0.040)	(0.047)
Age of wife	0.003***	0.002***	0.002***	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
DV × Age of wife	0.003**	0.002	0.003**	0.001	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Wife's age at marriage	0.009***	0.009***	0.007***			
	(0.001)	(0.001)	(0.001)			
DV × Wife's age at marriage	-0.006***	-0.006**	-0.006**			
	(0.002)	(0.003)	(0.003)			
Age Difference Husband-Wife		-0.003***	-0.003***			
		(0.001)	(0.001)			
DV × Age Difference Husband-Wife		-0.001	-0.001			
		(0.002)	(0.002)			
Wife's education				0.025***	0.026***	0.022***
				(0.001)	(0.001)	(0.001)
DV × Wife's education				-0.008***	-0.008***	-0.006**
				(0.002)	(0.002)	(0.003)
Education Difference Husband-Wife					0.002***	-0.000
					(0.001)	(0.001)
DV × Education Difference Husband-Wife					0.001	0.001
					(0.002)	(0.002)
Department Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	No	Yes	No	No	Yes
R-squared	0.043	0.044	0.074	0.078	0.079	0.091
Observations	25,528	20,595	19,831	25,528	25,090	21,082

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS
Columns 3 and 6 lose sample size because the wife did not report either her spouse's age or education.

Table 9: OLS Estimates: Effects of Employment and Age at Marriage on Self-reported Autonomy

	Own health care		Large purchases		Daily purchases		All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Wife has final say								
Employment	0.064***	0.064	0.079***	-0.032	0.032***	0.000	0.057***	0.079**
	(0.008)	(0.039)	(0.007)	(0.034)	(0.009)	(0.042)	(0.007)	(0.035)
Wife's age at marriage		-0.000		-0.000		-0.003		-0.000
		(0.002)		(0.001)		(0.002)		(0.001)
Employment × Wife's age at marriage		-0.001		-0.001		-0.001		-0.001
		(0.002)		(0.002)		(0.002)		(0.002)
Constant	0.548***	0.512***	0.108***	0.063	0.117***	-0.019	0.600***	0.532***
	(0.031)	(0.045)	(0.029)	(0.039)	(0.036)	(0.047)	(0.030)	(0.041)
Department Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wife's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Husband's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.071	0.071	0.033	0.039	0.043	0.051	0.054	0.055
Observations	21,345	21,345	21,345	21,345	21,345	21,345	21,345	21,345

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS
Female's characteristics: age, years of education, ethnicity.
Husband's characteristics: age, years of education, work status, alcohol consumption.
Household characteristics: wealth quintile group, urban/rural area.

Table 10: OLS Estimates: Effects of Employment and Education on Self-reported Autonomy

	Own health care		Large purchases		Daily purchases		All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Wife has final say								
Employment	0.064***	0.095***	0.079***	-0.053*	0.032***	0.067*	0.057***	0.121***
	(0.008)	(0.035)	(0.007)	(0.031)	(0.009)	(0.037)	(0.007)	(0.033)
Wife's education		0.014***		0.005***		0.011***		0.014***
		(0.002)		(0.002)		(0.002)		(0.002)
Employment × Wife's education		-0.004**		-0.000		-0.008***		-0.005***
		(0.002)		(0.002)		(0.002)		(0.002)
Constant	0.548***	0.434***	0.108***	0.041	0.117***	-0.113**	0.600***	0.455***
	(0.031)	(0.041)	(0.029)	(0.037)	(0.036)	(0.045)	(0.030)	(0.039)
Department Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wife's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Husband's Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.071	0.078	0.033	0.040	0.043	0.052	0.054	0.062
Observations	21,345	21,345	21,345	21,345	21,345	21,345	21,345	21,345

Standard errors in parenthesis, clustered at the PSU level
Significant at *** p<0.01, ** p<0.05, * p<0.1
Source: 2010 Colombian DHS
Female's characteristics: age, years of education, ethnicity.
Husband's characteristics: age, years of education, work status, alcohol consumption.
Household characteristics: wealth quintile group, urban/rural area.