

# Cash transfers and domestic violence<sup>\*</sup>

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Draft: March 12, 2012

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## *Abstract*

Violence against women is a major health and human rights problem yet there is little rigorous evidence as to how to reduce it. We take advantage of the randomized roll-out of Ecuador's cash transfer program to mothers to investigate how an exogenous increase in a woman's income affects domestic violence. Consistent with economic and sociological theories, we find that the effect of a cash transfer depends on a woman's education and her education relative to her partner's. Our results show that for women with greater than primary school education - who have better outside-of-marriage options - a cash transfer significantly *decreases* psychological violence from her partner. For women with a primary school education or less, however, the effect of a cash transfer depends on the woman's education relative to her partner's. Specifically, the cash transfer significantly *increases* emotional violence in households where the woman's education is equal to or more than her partner's.

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<sup>\*</sup> We would like to thank John Hoddinott, Agnes Quisumbing, Amber Peterman, Elizaveta Perova, Jeremy Magruder, Alain de Janvry, Elisabeth Sadoulet, Emily Flynn, Ann Weber, Jessica Jones-Smith, Rachel Gardner and Patricia Kariger for all their valuable comments. We gratefully acknowledge the collaboration and contributions of Norbert Schady, Caridad Araujo, and Christina Paxson. We are grateful to our Ecuadorian collaborators in Ecuador, and thank Santiago Izquierdo, Mauricio León, Ruth Lucio, Juan Ponce, José Rosero and Yajaira Vázquez. All errors remain our own.

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## 1 Introduction

Violence against women is a major health and human rights problem that is wide-spread and common (García-Moreno, Jansen et al. 2005; García-Moreno, Jansen et al. 2006). Recent multi-country studies on domestic violence conducted by the World Health Organization (WHO) and the Demographic Health Survey (DHS) show that lifetime prevalence of physical and sexual violence towards women by a spouse or partner is anywhere between 15%-75%, with the highest prevalences found in Peru (69%), Ethiopia (71%), and Bangladesh (75%) (García-Moreno, Jansen et al. 2006; Hindin, Kishor et al. 2008). In Ecuador the lifetime prevalence of physical violence (31%), sexual violence (12%), and psychological violence (41%) is also high (CEPAR 2005).

Violence towards women is both a cause and a consequence of gender inequality, and thus creates an obstacle for achieving the Millennium Development Goals (García-Moreno, Jansen et al. 2005). The consequences of domestic violence are extensive and range from the direct physical and mental harm of women and their children to economic losses at the community and national level. Physical violence is associated with victims in both developed and developing countries having poor health, depressive symptoms, substance abuse problems, and developing chronic diseases and mental illnesses (Coker, Davis et al. 2002; Ackerson and Subramanian 2008; Ellsberg, Jansen et al. 2008). For children, exposure to domestic violence is associated with lower birth weight and IQ scores, and increased emotional and behavioral problems (Sternberg, Lamb et al. 1993; Koenen, Moffitt et al. 2003; Wolfe, Crooks et al. 2003; Aizer 2010). Furthermore, children who suffer from social and emotional problems caused by domestic violence create spillover effects such as decreasing the academic achievement of classroom peers (Carrell and Hoekstra 2010). The economic costs of domestic violence are also high. In the United States, the cost of domestic violence is estimated at \$5.8 billion per year, which includes the cost of medical services and the cost of lost productivity (CDC 2003). In Colombia the estimated cost of domestic violence due to lost labor earning of women is 7.1 billion pesos or approximately 3.2% of GDP in 2003 (Ribero and Sánchez 2005).<sup>1</sup> These

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<sup>1</sup> Estimated cost of intra-family violence is 9.4 billion pesos or approximately 4.2% of GDP, and this includes lost labor earning of women due to violence towards their children and themselves.

estimates are most likely lower bound estimates given that they do not calculate indirect costs such as costs due to behavioral problems of children who witness domestic violence.

Although the consequences of domestic violence are well documented, there is less evidence about public policies or programs that could help reduce domestic violence. In the United States, studies have found that unilateral divorce laws (Stevenson and Wolfers 2006), reductions in the male-female wage gap (Aizer 2010), and community advocacy services for women (Sullivan and Bybee 1999) reduce domestic violence. In South Africa, a micro-finance program for women that was combined with health education led to reductions in domestic violence (Pronyk, Hargreaves et al. 2006), and a community-based educational program (Stepping Stone) led to reductions in men reporting they had committed domestic violence but no corresponding reduction in woman reporting experiencing domestic violence (Jewkes, Nduna et al. 2008).

In developing countries, a handful of studies on policies that reduce domestic violence focus on the impacts of conditional cash transfer (CCTs) programs, which have become a very popular tool for reducing poverty and increasing human capital (Fiszbein, Schady et al. 2009). CCTs operate by giving cash payments to mothers only if they comply with a certain set of requirements relating to the health and education of family members. Since CCTs give money to the mothers and not the fathers, the programs provide an opportunity to study how increases in women's incomes affect domestic violence. Bobonis et al. study the effects of Mexico's CCT program, *Oportunidades*, and find that in the short run (2-6 years) physical violence decreased by 33% (2009), but these effects disappeared 5-9 years after the program was implemented (2010). The main reason given for the discrepancy in shorter and longer term impacts is marital selection, and in particular the types of couples choosing to remain in the relationship. In Peru, Perova (2010) finds that that in the short run its CCT program, *Juntas*, significantly decreased physical violence by 9% and emotional violence by 11%. Programs in both Peru and Mexico are *conditional* cash transfer programs and thus it is impossible to completely isolate the income effect on domestic violence from the conditions. In particular, the health requirements of CCT programs could lead to decreases in domestic violence because increased exposure to health facilities makes it harder to hide physical and sexual abuse, and health care providers are often trained in dealing with domestic violence. Furthermore, the required health and nutrition monthly information sessions (pláticas) empowered women (Adato, Coady et al. 2000; Adato, de la

Brière et al. 2000) and thus could also lead to reductions in domestic violence. By focusing on an *unconditional* cash transfer to mothers in Ecuador we are able to isolate the income effect and thus contribute to the existing literature.

There is no consensus on the association between wealth or socio-economic status and domestic violence. In a recent review of studies in low and middle income countries that investigated the relationship between socio-economic status and having ever experienced domestic violence, 7 studies reported a significant protective association, 10 revealed no significant trend or association, and one study showed that higher income was associated with more physical violence (Vyas and Watts 2009). Similarly, a multi-country study revealed that in 7 countries (Bangladesh, Dominican Republic, Kenya, Moldova, Rwanda, Bolivia and Zimbabwe) women from the richest 20% of households were least likely to experience domestic violence. In Zambia, however, the opposite was true, and in 2 countries (Haiti and Zambia) there were no significant associations between wealth and violence (Hindin, Kishor et al. 2008).<sup>2</sup> The association between female income and domestic violence is also ambiguous. In the review of low and middle income studies, Vyas and Watts (2009) found that higher female income was not significantly associated with domestic violence in India; however, earning an income was associated with higher physical violence. Earning an income was also associated with higher domestic violence in rural Bangladesh, the Dominican Republic, and Nicaragua; however, it was associated with lower domestic violence in Egypt and had no significant association in Haiti, urban Bangladesh, Zambia, or Cambodia. The main reasons given for the heterogeneous findings have to do with temporal and contextual factors. In particular, in settings where women usually do not work outside the home, employment may initially lead to tensions; however, these tensions may decline over time as the partner begins to recognize the benefit and the changing norm (Vyas and Watts 2009).

The previous studies that have looked at the association between income and domestic violence often fail to establish a causal relationship due to issues of omitted variable bias or reverse causality inherent in cross-sectional studies (Vyas and Watts 2009; Aizer 2010). We are able overcome these issues by taking advantage of the randomized roll-out of Ecuador's unconditional cash transfer program to mothers, the Bono de Desarrollo Humano (BDH), to

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<sup>2</sup> Results are from bivariate analysis. In multivariate analysis, associations become weaker and only significant in 4 of the 10 countries.

study the impact of an exogenous increase in a woman's income on domestic violence. We focus on physical violence and psychological violence, which is categorized into emotional violence and controlling behaviors by a husband or partner. We find that for women with more than primary school education (more than 6 years of schooling), the BDH significantly *decreases* emotional violence by 8% and controlling behaviors by 14%. For women with primary education or less, we find that the effect of the BDH depends on whether or not the husband or partner has more years of schooling than his wife or partner. For households where the husband does *not* have more schooling than his wife, we find that the BDH significantly *increases* emotional violence by 9%. We do not find any corresponding changes in physical violence. These results are consistent with economic household bargaining models explained in detail in the section below.

The remainder of the paper proceeds as follows: Section 2 provides a description of the theories of domestic violence and develops predictions based on these theories; Section 3 describes the study design and data we use to conduct our analysis; Section 4 presents the estimation strategy and results; and Section 5 concludes.

## **2 Theories on income and domestic violence**

Literature in sociology presents theoretical reasons why an increase in a woman's income may help reduce domestic violence. One argument is that institutions in society that promote masculinity and gender inequality can be a trigger for domestic violence (Straus and Hotelling 1980; Jewkes 2002). Consequently, a cash transfer that empowers females and leads to a greater degree of financial equality could lower the prevalence of domestic violence. Another sociological theory asserts that poverty-related stress is one of the driving forces behind domestic violence (Straus 1980; Jewkes 2002). Thus, a cash transfer that improves household welfare and reduces stress should reduce the incidence of violence. Psychological theories on the other hand argue that domestic violence is a disorder of power and control where a man may resort to violence as a means for reinstating his authority over his wife (Pence and Paymar 1993; Macmillan and Gartner 1999). Consequently, an increase in a woman's earning could actually increase domestic violence if a partner feels threatened as a result of an increase in his wife's income. Similarly, status inconsistency theories argue that psychological stress and tensions

within relationships are a consequence of husband and wife occupying atypical combinations of status characteristics (Hornung, McCullough et al. 1981). Consequently, an increase in her income could increase domestic violence if it leads to atypical roles within the household such as the woman being the main income earner.

Economic models are also inconclusive as to the associations between income and domestic violence. In household bargaining models, individual control of resources is important because bargaining outcomes depend on threat points such as divorce (Manser and Brown 1980; McElroy and Horney 1981) or non-cooperative equilibriums (Lundberg and Pollak 1993). The more attractive an individual's opportunities outside the family, the more credible the threat point, and therefore, the more likely that the intra-family distribution of resources will align more closely with that individual's preferences. Tauchen et al (1991) and Farmer and Tiefenthaler (1997) expand on the bargaining models to specifically account for domestic violence and conclude that when a woman's utility outside of marriage or partnership (also known as reservation utility) equals her utility from marriage or partnership, then an increase in her income will decrease domestic violence by increasing the likelihood that she leaves the relationship. Consequently, a cash transfer to women would decrease domestic violence by improving their outside-of-marriage options, thus, making their threat points more credible. Eswaran and Malhotra (2011), however, assert that the relationship between increasing a woman's reservation utility and domestic violence is not necessarily monotonic. In fact, a possible response of an increase in a wife's reservation utility is greater domestic violence because a woman might find it worthwhile to allocate resources more in line with her preference, and so much so, that it might increase violence.

Increases in domestic violence as a result of increases in women's income are also explained in extraction models. For example, Bloch and Rao (2002) explain dowry violence in India using a model where violence is used as a bargaining instrument by a husband to extract rents from the wife's family. Their model predicts that women from richer families are at increased risk of violence because there are more resources to extract. Using this logic, Bobonis et al. (2009) develop a model for Mexico's CCT program that predicts that cash transfers paid to women increase the threat of domestic violence with no associated physical violence because there are more resources to extract. A crucial assumption of these extraction models is that wives

prefer an intact marriage over anything else. Thus, in contexts where divorce and separation are feasible and acceptable options, the conclusions of their models might not hold.

Finally, there are economic models that contain aspects from both the bargaining and extraction models. In these models, an increase in a woman's income increases her threat point and creates greater incentives for a husband to extract rents (Perova 2010). In both Perova's (2010) and Tauchen's (1991) models, a sufficient condition for the relationship between a woman's income and domestic violence to be unambiguously negative is for a woman's utility outside of marriage or partnership to equal her utility from marriage or partnership (binding case).<sup>3</sup> When a woman's utility from marriage is greater than her utility outside of marriage (non-binding case), then the association between a woman's income and domestic violence is ambiguous.

For the non-binding case, Tauchen et al. (1991) assert that an increase in a woman's income will generally decrease domestic violence except in cases when a husband's or partner's marginal utility for violence increases with her consumption (i.e., a preference for violence against a woman with more purchasing power). In these cases, an increase in a woman's income will *increase* domestic violence. In their analysis they find that a husband's marginal utility for violence increases with her consumption when the woman is the main income earner; and consequently, an increase in her income increases domestic violence. One explanation they give for this surprising result is that an increase in violence could result if the woman is unwilling to make transfers to him. Another way to interpret Tauchen's result, which is in line with the psychological literature, is that when the husband or partner feels threatened by his relative status with respect to his wife's, it is more likely that his marginal utility for violence increases with her consumption.

The review of economic models above reveals that there is not a consensus on how increases in a woman's income will affect domestic violence. In fact, many of the new theories assert that in certain situations, such as when the female is the main income earner or when females work outside the home, domestic violence can actually increase. We contribute to the existing literature by using an exogenous increase in a woman's income to investigate situations when an increase in a woman's income leads to a decrease in domestic violence and when it

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<sup>3</sup> The assumption for this negative relationship to hold is that the marginal utility of income outside of the relationship is at least as great as it is in the relationship.

might actually lead to an increase. We focus on the interacting effects of women's education because women with more education are more likely have better out-of-marriage options and thus higher reservation utilities (Farmer and Tiefenthaler 1997; Eswaran and Malhotra 2011). Not only are women with more education more likely to find work, receive a higher wage rate, and be financially independent, but they also face a better marriage market (Lundberg and Pollak 1996; Pollak 2005). However, we focus not just on women's absolute education, but also on their relative education with respect to their partner because many studies find that women with more education than their partners experience more domestic violence (Hornung, McCullough et al. 1981; Flake 2005; Ackerson, Kawachi et al. 2008).

### **3 Study design and data**

#### ***3.1 The Bono de Desarrollo Humano***

In 1998 Ecuador created its largest social assistance program called Bono Solidario. The Bono Solidario consisted of an unconditional cash transfer of 100,000 sucres (approximately \$15 USD) per month to poor mothers and 50,000 sucres (approximately \$7.5 USD) per month to elders and handicapped. Due to substantial leakage to non-poor families, the Bono Solidario was phased out and replaced by the Bono de Desarrollo Humano (BDH) in 2003. The major improvement of the BDH over the Bono Solidario was that it was means-tested. Thus, households who were in the bottom two poverty quintiles according to the Sistema de Selección de Beneficiarios (SELBEN) index qualified for the transfer. In practice the change from Bono Solidario to Bono de Desarrollo Humano meant that 60% of families who were receiving the transfer under the Bono Solidario continued to receive it under the BDH. The other 40% stopped receiving the transfer and a new set of families who were eligible were brought into the program. Our study focuses on this new set of families who were gradually brought into the program.

The BDH was initially designed as a CCT program that consisted of giving mothers a monthly stipend if their children met certain schooling and health care requirements. However, due to administrative constraints the conditions were never implemented, thus making the BDH equivalent to an unconditional cash transfer. Another feature of the BDH is that the transfer size does not depend on the number of children in the household. The size of the transfer in 2005 was \$15/month which was approximately 6-10% of an average household's pre-transfer expenditure



for households in the bottom two poverty quintiles (Fiszbein, Schady et al. 2009; Paxson and Schady 2010).

### ***3.2 Study Design***

Beginning in 2003 the BDH was rolled out slowly across the country to new families that qualified for the transfer. This gradual roll-out allowed two separate randomized evaluations to be conducted: a health evaluation (Paxson and Schady 2010; Fernald and Hidrobo 2011) and an education evaluation (Schady and Araujo 2008). The study reported here uses the data collected for the health evaluation where 378 parishes (the smallest administrative unit in Ecuador) from six provinces (three coastal and three highland provinces) were randomized into treatment and control groups. Parishes were stratified into rural and urban groups and from each group treatment and control parishes were randomly selected. In total, 118 parishes were selected for the experiment: 79 in the treatment group and 39 in the control group.

The BDH became available to rural treatment parishes in June 2004 and to urban treatment parishes in November 2004. The transfers were not available to control parishes until after 2006. Transfers were administered by the Government of Ecuador and distributed through a large network of private banks (Banred) and through the National Agricultural Bank (Banco Nacional de Fomento). According to survey response data from 2005, there was very little contamination of the experiment: take-up of the BDH program was 73% for the treatment group and only 3% for the control group.

Baseline (October 2003-March 2004) and follow-up (September 2005-January 2006) surveys were conducted by the World Bank and the Government of Ecuador. In order to be included in the baseline survey sample, households had to meet the following criteria: have at least one preschool age child, have no children older than 6 years old, be eligible for the cash transfer program, and not have been recipients of the previous welfare program, Bono Solidario. Households in treatment and control parishes that met the criteria above were then randomly sampled for the evaluation. The total sample at baseline consisted of 3,426 households. Given that our study focuses on spousal domestic violence, our analysis is conducted only on mothers who were living with their husbands or partners at the baseline survey. Thus, of the 3,426 mothers, we use 2,354 for our analysis (Figure 1).

### **3.3 Data**

The baseline and follow-up surveys collected information on children and their mothers' health status and health care usage. For this study we concentrate on the spousal domestic violence data that was collected in the baseline and follow-up surveys. A list of the domestic violence questions that were administered can be found in the appendix (Table A1).

Domestic violence is a multidimensional and complex issue that is usually categorized into physical violence, psychological violence, and sexual violence. We concentrate on physical and psychological violence because data on sexual violence was not collected. Physical violence is defined by the World Health Organization (WHO) as: "The intentional use of physical force with the potential for causing death, injury, or harm. Physical violence includes, but is not limited to scratching, pushing, shoving, throwing, grabbing, biting, choking, shaking, poking, slapping, punching, hitting..."(Ellsberg and Heise 2005 p. 93). In the follow-up survey there are two questions on physical violence. The first question asks whether the mother has ever been pushed, hit or physically harmed by her husband or partner and the second asks whether it occurred frequently or sometimes. We use only the first question to create a physical violence indicator that equals one if a mother reports yes to having been pushed, hit, or physically harmed by her partner.

Psychological violence is defined by the WHO as "Any act or omission that damages the self-esteem, identity, or development of the individual. It includes, but is not limited to humiliation, threatening loss of custody of children, forced isolation from family or friends, threatening to harm the individual or someone they care about, repeated yelling or degradation, inducing fear through intimidating words or gestures, controlling behavior,..." (Ellsberg and Heise 2005 p. 93). Operationally, WHO divides this definition of psychological violence into "emotional violence" and "controlling behavior by a partner" (García-Moreno, Jansen et al. 2005). In the follow-up survey there are four questions that can be categorized as "emotional violence", three that can be categorized as "controlling behavior" and two that can be categorized as "emotional support" (see Table A1 in appendix for questions and categories). Given that the WHO only uses emotional violence and controlling behaviors in their definitions, we concentrate on these 2 categories for the construction of our psychological violence variables. For each of the emotional violence or controlling behavior questions, the survey asks if a husband or partner "frequently", "sometimes", or "never" exhibits a specific behavior. We create

an indicator for emotional violence that equals one if the respondent answered frequently or sometimes to any of the four emotional violence questions. For controlling behavior, we create an indicator that equals one if the respondent answered “frequently” or “sometimes” to any of the three controlling behavior questions.

### **3.4 Attrition**

Of the 2,354 mothers living with their partners at baseline, 93% were re-interviewed at follow-up. Although 93% of mothers from the baseline were successfully re-interviewed for the follow-up, the domestic violence questions were only administered to mothers if they were still living with their partner. Consequently, of the 2,190 mothers in the follow-up survey, 2,028 (92.6%) were still living with their partners. Given the highly sensitive nature of domestic violence questions, of the 2,028 mothers who could be administered the questions, only 1,254 (61.8%) were actually administered them (Figure 1). The reasons given for not answering the domestic violence questions were: husband was present (80.1%), husband's relative was present (11.5%), another person was present (4.7%), she did not want to answer or she was not sure why she did not want to answer (3.1%), and other (.6%). Although survey enumerators were trained to not administer the domestic violence questions if a partner was present, 4 mothers were administered the questions with their partners present. Given that the presence of their partners could influence their response, we drop these 4 mothers from our sample and thus we are left with 1,250 mothers for our analysis. We refer to this sample of mothers as our “study sample”. Of the 1,250 mothers in our study sample, 1,236 have complete data for the emotional violence indicator, 1,218 for the controlling behavior indicator, and 1,246 for the physical violence indicator.

As a consequence of the sensitivity and requirements for being administered the domestic violence questions described above, attrition in our sample is high. If attrition is correlated with treatment assignment, then this could potentially bias the estimates of the impact of a cash transfer on domestic violence. Table 2 reveals that attrition is not correlated with treatment at any of the three time points when attrition occurred: from baseline to follow-up; at follow-up for mothers who were still living with their partners; and at follow-up for mothers who were administered the domestic violence questions without their husbands present.

Table 3 examines the baseline characteristics of those who were administered the domestic violence questions at follow-up (“In study”) and those who were not (“Attrited”). Given the requirements for being administered the domestic violence questions, we expect there to be differences between those in the study sample and those not in the study sample; however, differential attrition across treatment and control arms would threaten the internal validity of the study. In particular, if mothers who experience more domestic violence leave the treatment arm in greater proportions than the control arm, then our treatment estimates will be biased because any decrease in domestic violence will be due to both treatment and differential attrition. In order to examine if differential attrition threatens the internal validity of the study, we focus on columns 7 and 8 of Table 3. Except for an indicator for husband or partner not spending free time with his wife or partner, there are no statistically significant differences at the 5% level in baseline characteristics for those not in the study across treatment and control arms (column 8). The differential attrition with respect to spending free time with wife or partner could potentially bias the treatment effect towards zero if not spending free time with wife is positively correlated with domestic violence. In other words, the higher rate of partners not spending time with their wives that leave the control group compared to the treatment group would bias our estimates because those that remain in the control group would display lower rates of domestic violence. Table 4 examines baseline differences between treatment and control groups for the study sample and reveals that the differences in spending free time with wife or partner are not significant; and therefore, the bias due to the differential attrition of this variable is likely to be very small.

### ***3.5 Baseline analysis***

The sample of mothers we use for this study are those who were living with their partners at baseline and who were still living with their partner during the follow-up survey, whose husband or partner was not present during the time of the follow-up survey, and who were willing to answer the domestic violence questions at follow-up. Given the restrictions for being administered the domestic violence questions only a fraction of mothers that were administered the questions at follow-up were also administered them at baseline. Although we do not have complete baseline information on domestic violence for our study sample, we do have complete

information on all other household and mother characteristics. Table 4 shows that random assignment was effective at balancing baseline characteristics of treatment and control groups for our study sample.<sup>4</sup> Of the 28 variables examined, the only variable that is significantly different between treatment and control groups is the indicator for whether or not the husband or partner allows his wife or partner to study or work. In the control group 41% of husbands or partners do not allow their wives to study or work compared to 31% in the treatment group. Although this controlling behavior indicator is significantly different, the aggregate “controlling behavior” variable (which is made up of the 3 controlling behavior questions) that we use in our analysis is balanced across treatment and control arms.<sup>5</sup>

Table 4 reveals that the prevalence of domestic violence is high, with 28% of all mothers in the study sample experiencing physical violence; 53% experiencing emotional violence and 56% experiencing controlling behaviors by husband or partner. Of the mothers that report experiencing emotional violence, 47% also report experiencing physical violence and 71% also report experiencing controlling behavior by husband or partner. Of the mothers that report experiencing controlling behaviors, 43% also report experiencing physical violence and 73% also report experiencing emotional violence. Of the mothers that report experiencing physical violence, 77% also report experiencing emotional violence and 68% also report experiencing controlling behaviors.

Mothers in the study sample are young with a mean age of 23.6 years, they have more years of schooling than their partners (7.5 versus 7.3 years), and only 45% of mothers living with their partners are actually married. Such a low percentage of married mothers reveals that options outside of marriage are common in Ecuador, and thus, the dissolution of marriage is a credible threat point.

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<sup>4</sup> Schady and Paxson (2010) and Fernald and Hidrobo (2011) also show that random assignment was effective at balancing baseline characteristics of treatment and control groups for the full sample of households.

<sup>5</sup> While we use all three controlling behavior questions to create the aggregate “controlling behavior” variable, our results are robust to creating the variable using only the two controlling behavior questions (husband or partner ignores you; husband or partner does not allow you to see friends or family) that are balanced across treatment and control groups.

## 4 Empirical analysis and results

### 4.1 Empirical strategy

To estimate the treatment effect of the BDH on domestic violence we take advantage of the randomized roll-out of the program and conduct an intent-to-treat analysis. This approach avoids any bias that might occur due to selection into and out of the program. We conduct all estimations using linear probability models; however, results are robust to using probit models. The specific equation that we estimate is the following:

$$DV_{ip} = \delta + \beta T_p + \alpha X_{ip} + \varepsilon_{ip} \quad (1)$$

Where  $DV_{ip}$  is the domestic violence indicator (physical violence, emotional violence, or controlling behavior) for mother  $i$  from parish  $p$ .  $T_p$  is an indicator for whether parish  $p$  is in the treatment group and  $X_{ip}$  is a vector of control variables.  $\beta$  measures the average effect of the BDH on domestic violence. Given the success of the random assignment, the inclusion of baseline controls is not necessary to obtain unbiased estimates of  $\beta$ . In most estimates, however, we include baseline mother (age, years of schooling, race, marital status, partner's years of schooling, whether mother has had a child die, whether a mother is currently pregnant) and household (number of children 0-5 years old, urban indicator, asset index<sup>6</sup>, province indicators, and an indicator for whether or not kitchen is used for sleeping) control variables in order to increase the precision of the estimates. In all regressions we cluster the standard errors at the parish level.

In addition to estimating the average effect of the BDH, we estimate the differential effect with respect to a mother's education because women with more education have higher reservation utilities, and thus, are more likely to experience less domestic violence. In Ecuador, secondary education begins after 6 years of formal schooling, and in our study sample, 46% of mothers have more than a primary education. Consequently, we use this cut-off to separate mothers into "more educated" and "less educated" groups. We also estimate the differential effect of the BDH with respect to a mother's relative education to her partner's because studies

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<sup>6</sup> Asset index is constructed using the first principal from a Principal Component Analysis. Variables used to construct the index are housing infrastructure indicators (e.g. type of floor, roof, toilet, light, fuel, and water source) and asset indicators (e.g. refrigerator, small stove, TV, car, motorcycle, and computer).

have found that woman with more education or income than their partners experience more domestic violence. The equations that we estimate are the following:

$$DV_{ip} = \delta + \beta_1 T_p + \beta_2 T_p * S_{ip} + \beta_3 S_{ip} + \alpha X_{ip} + \varepsilon_{ip} \quad (2)$$

where  $S_{ip}$  is an indicator that equals one if a mother has more than primary education (more than 6 years of schooling) or an indicator that equals one if a mother has less schooling than her partner.  $\beta_1$  measures the effect of the BDH for the omitted category (mothers with 6 years or less of schooling or mothers with equal to or more schooling than their partners), while  $\beta_1 + \beta_2$  measures the effect of the BDH for mothers with more than 6 years of schooling or mothers with less schooling than their partners. Thus,  $\beta_2$  is the differential impact of the BDH with respect to a mother's absolute or relative education.

## **4.2 Average effects**

Table 5 presents the results of estimating the effect of a cash transfer on emotional violence (column 1 and 4), controlling behavior (column 2 and 5), and physical violence (column 3 and 6). In the first three columns we estimate the treatment effect without any controls, and in the last three columns we add control variables. As expected given the successful random assignment, adding control variables hardly changes the size of the coefficient on treatment. Being in the treatment group has no effect on emotional and physical violence, and a negative and significant impact on controlling behaviors. Table A2 in the appendix examines the impact of the BDH on each of the 7 psychological violence indicators used to construct the emotional violence and controlling behaviors indicators. While the treatment effect is negative for all indicators, the BDH only leads to a significant decrease in the probability that a partner does not allow his wife or partner to see her friends or family; and a marginally significant decrease in the probability that a partner does not allow his wife or partner to study or work.

Table 5 also reveals that domestic violence is more likely to occur when the partner has fewer years of formal schooling; the mother is indigenous, not married, and younger; and the household is from a rural area, the number of children 0-5 years old is high, and the kitchen is used for sleeping. The positive correlation between domestic violence and having the kitchen used for sleeping suggests that household crowding and poverty are stressors on relationships. Even though the provinces in the study are not composed of large indigenous populations (the

proportion of indigenous mothers in our sample is 5%), we still observe a large and positive correlation of indigenous status on domestic violence. Specifically, indigenous women are 10% more likely to experience controlling behaviors from their partners and 16% more likely to report physical abuse than non-indigenous woman. There are many socio-economic factors that could explain this strong positive relationship such as the fact that indigenous woman are poorer, have less education, and have less access to health, legal services, and employment opportunities (Hughes 2004; Hall and Patrinos 2006).

### **4.3 Heterogeneous effects**

Table 6 presents the heterogeneous impact of the BDH with respect to a mother's education. Given that a mother's education is highly correlated with wealth and race, in columns 4-6 we control for the interaction of these variables with treatment, in order to isolate the heterogeneous impact with respect to a mother's education. As Table 6 reveals, the BDH has no effect on any of the domestic violence indicators for mothers with 6 years or less of schooling, but for mothers with more than 6 years of schooling the effect of the BDH is negative and significant for emotional violence and controlling behaviors, even after controlling for other possible interactions. Specifically, for mothers with more education the BDH decreases the probability that a husband or partner engages in emotional violence by 8% and controlling behaviors by 14%. The treatment effect for mothers with more education is significantly different than that for mothers with less education for both emotional violence and controlling behaviors. The significant decrease in emotional violence for mothers with more than 6 years of schooling is due to significant decreases in 2 out of the 4 emotional violence indicators (Appendix, Table A3). Similarly, the significant decrease in the probability that a partner exhibits controlling behaviors for mothers with more than 6 years of schooling is due to significant decreases in all 3 controlling behavior indicators (Appendix, Table A3). There is no effect of the BDH on physical violence for any group of mothers.

Given that table 6 reveals that the impact of the BDH on domestic violence depends on a mother's overall education, we estimate the heterogeneous effect of the BDH with respect to a mother's relative education, separately for mothers with low and high education. Table 7 shows that the heterogeneous impact with respect to mother's having less schooling than their partners



is negative and significant for the emotional violence indicator for both mothers with low and high education. However, it is not significant for the controlling behavior indicator or physical violence. More importantly, table 7 reveals that the BDH significantly *increases* emotional violence by 9% for mothers with 6 years or less of schooling in households where they have at least as much schooling as their partners (column 1). The BDH has the largest negative impact on domestic violence for mothers with more than 6 years of schooling who still have less schooling than their partners. For this group of mothers, the BDH leads to a significant decrease in emotional violence by 27%, controlling behavior by 17%, and to a large but non-significant decrease in physical violence by 10%.

#### **4.4 Robustness**

One concern with the estimates reported above is that they may be confounded by self-reporting bias. Domestic violence is a sensitive issue and thus subject to a high degree of under-reporting. The most important factors influencing disclosure are the adequate training of interviewers, safety measures that ensure privacy during interviews, and administering multiple behaviorally specific questions (Ellsberg, Heise et al. 2001). Although measures were taken to reduce under-reporting (such as ensuring husband was not in the household at the time of the interview), we cannot dismiss this issue completely. If under-reporting leads to classical measurement error, then our estimates will be lower bound estimates. However, if under-reporting is associated with treatment, and specifically, if those that are in the treatment group are more likely to under-report (this might occur if individuals believe their response to the survey affects whether or not they received a transfer), then our estimates will be biased away from zero for the following three groups: 1) women with more than 6 years of schooling who have less years of schooling than their partners, 2) women with more than 6 years of schooling whose years of schooling are equal to or more than their partners, and 3) women with 6 years or less of schooling who have less years of schooling than their partners. For the fourth group - women with 6 years or less of schooling whose years of schooling are equal to or more than their partners - the estimates would be lower bound estimates. If those that are in the control group are more likely to under-report, then the opposite pattern in bias would occur. Given that there are no strong arguments for why we should expect those in the treatment or control group to be more

likely to under-report, any bias from differential under-reporting is likely to be small. Moreover, bias from classical measurement error due to under-reporting is likely to be small because steps were taken to ensure confidentiality and multiple behaviorally specific questions were administered in order to elicit disclosure of violence.

Another concern with our inference is that while the BDH was randomized across treatment and control parishes, the research design was not stratified across education groups. Consequently, there could be pre-existing differences between treatment and control arms across the four groups analyzed. For example, for those in the fourth group (6 years or less of schooling, mother's education  $\geq$  partner's education), if the treatment arm had a higher proportion of indigenous mothers than the control arm, then the higher probability of emotional violence in the treatment arm could be due to this higher proportion of indigenous mothers. To show that preexisting differences are not a concern, we compare baseline characteristics across treatment and control arms for all four education groups that were in our study sample. Table 8 reveals that across the 76 difference-of-means tests (4 groups X 19 variables) there are only 3 significant difference in means between treatment and control arms at the 5% level. In the “more than 6 years of schooling, mother's schooling  $<$  partner's schooling” group, the control arm has a higher proportion (22% v. 6%) of Afro-Ecuadorians. This larger proportion of Afro-Ecuadorians in the control arm is most likely the reason that for this group of mothers, there is also a significant difference in means for the asset index and having had a child die. However, given that being Afro-Ecuadorian is negatively correlated with domestic violence, having more Afro-Ecuadorians in the control arm will bias our estimates toward zero for this group of mothers. Thus our estimates for mothers with “more than 6 years of schooling, mother's schooling  $<$  partner's schooling” are lower bound estimates. Nevertheless, in all our regressions we control for being Afro-Ecuadorian, the asset index, and having a child die, and thus, the bias is likely to be small. More importantly, Table 8 also shows that there are no significant differences between treatment and control arms on any of the baseline domestic violence indicators (emotional violence, controlling behaviors, and physical violence) for any of the four groups studied.

A close examination of Table 8 reveals that the average years of schooling for partners is very low (5 years) for households where women have 6 years or less of schooling and whose years of schooling are equal to or more than their partners'. Consequently, it could be a partner's low education levels and not necessarily his education relative to his wife or partner's that is

driving the positive relationship between an increase in a woman's income and emotional violence. In order to rule out this story we estimate the effect of the BDH for partners with 6 years or less of education and we find no significant effect on any of the domestic violence indicators for women with less education (results not shown).

Although Table 8 provides evidence for the internal validity of our estimates, we are still concerned with the external validity. Specifically, within our population of interest (poor young mothers who live with their husband or partners), only those who were willing to respond and whose husband or partner was not present at the time of the survey were administered the domestic violence questions. If husbands that are unemployed are more likely to be present at the time of the survey, and these husbands are also more likely to inflict violence on their partner, then our estimates will be lower bound estimates. Similarly, if women most affected by violence are the ones who are most likely not willing to respond, then our estimates will be lower bound estimates. In order to account for selection due to no-response or presence of husband, we re-run all our specifications using inverse probability weights (IPW). Under an ignorability assumption, Wooldridge (2002) shows that inverse probability weighting produces a consistent normal estimator which is identical to an unweighted estimate if there is no attrition problem. In the first stage of IPW, we predict the probability of being administered the domestic violence questions for mothers who live with their partners using all baseline control variables from the previous models in addition to the following baseline variables: indicators for month of survey, indicator for mothers who are not household heads or spouses of household heads, household size, indicator for farming households, indicator for whether mother answered domestic violence questions at baseline, indicator for whether mother was in the hospital, and a mother's CES-D depression score. We then use the inverse of the predicted probabilities as weights in all our specifications and we find that estimates from IPW (results not shown) are very similar to the unweighted estimates in tables 5-7, and thus, bias due to selective attrition within our population of interest is minimal.

## **5 Conclusion**

In the literature, there is no consensus on the direction of the relationship between a woman's income and spousal domestic violence, and the contradictory evidence is due to contextual factors related to culture, community, timing, and household dynamics. In this paper we explore

how household dynamics influences this relationship; and specifically, we investigate whether the impact of an increase in a woman's income on domestic violence depends not only on a woman's overall education level, but also on her education relative to her husband's. We take advantage of the randomized roll-out of a cash transfer program to mothers and find that for mothers with more than 6 years of schooling, the BDH significantly *decreases* the probability that a husband or partner engages in emotional violence by 8% and controlling behaviors by 14%. For mothers with 6 years or less of schooling, the effect of the BDH on domestic violence is ambiguous and depends on the difference in levels of formal schooling between the mother and her partner. In particular, for households where the mother's years of schooling is equal to or more than her partner's, the BDH significantly *increases* emotional violence by 9%.

Even though we find that the BDH decreases psychological violence for certain households and increases it for others, we never observe a significant corresponding decrease or increase in physical violence. One likely reason for this lack of significant impact is that physical violence is more likely to be under-reported. Not only are women more likely to be afraid for their safety if they have been physically abused, but the physical violence indicator came from one aggregate question as opposed to multiple behaviorally specific questions which are known to be more effective in eliciting disclosure of violence (Ellsberg, Heise et al. 2001). Given that physical violence is more likely to be under-reported and that there is a high correlation between physical violence and psychological violence our results can be used as suggestive evidence for the direction in which an increase in a woman's income would impact physical violence.

It is important to emphasize that the results of the impact of a cash transfer on domestic violence are specific to the population studied: poor young mothers who have young children and who live with their husbands or partners. While these results cannot be generalized to Ecuador's population as a whole, they do provide insight for a large, vulnerable segment of the population. It is also important to stress that the results of an increase in a woman's income on domestic violence are specific to an increase in income that is due to the creation of a cash transfer program, and thus, the results may be different if the increase in income is work related.

To our knowledge, this is the first paper in a developing country to investigate the effects of an *unconditional* cash transfer to mothers on domestic violence, and adds to the existing but small literature on the effects of *conditional* cash transfers on domestic violence. Given that the cash transfer is not tied to health and education requirements, we are able to isolate the income

effect of the cash transfer program. In our analysis we show that although an increase in a woman's income leads to a decrease in domestic violence for many households, there are vulnerable households where domestic violence actually increases as a consequence of the income. In particular, these vulnerable households are those where a woman has little schooling, but her schooling is still greater than or equal to her partner's. These results are consistent with both economic household bargaining models and status inconsistency theory because it is in these households where we are most likely to find woman with low outside of marriage options and whose partner is likely to feel threatened by an increase in her income. In light of these results, policy makers are challenged to identify these vulnerable women and take measures to reduce their risk. Although the primary goal of the Bono de Desarrollo Humano was not to decrease domestic violence, we show yet another dimension in which a cash transfer can greatly affect the everyday lives of poor women.

## References

Ackerson, L. K., I. Kawachi, et al. (2008). "Effects of individual and proximate educational context on intimate partner violence: a population-based study of women in India." American journal of public health **98**(3): 507.

Ackerson, L. K. and S. Subramanian (2008). "Domestic violence and chronic malnutrition among women and children in India." American journal of epidemiology **167**(10): 1188.

Adato, M., D. Coady, et al. (2000). "An operations evaluation of PROGRESA from the perspective of beneficiaries, promotoras, school directors, and health staff." Washington, DC: International Food Policy Research Institute.

Adato, M., B. de la Brière, et al. (2000). "The impact of PROGRESA on women's status and intrahousehold relations." Final report. Food Consumption and Nutrition Division, International Food Policy Research Institute, Washington, DC.

Aizer, A. (2010). "Poverty, Violence and Health: The Impact of Domestic Violence During Pregnancy on Newborn Health."

Bloch, F. and V. Rao (2002). "Terror as a bargaining instrument: A case study of dowry violence in rural India." The American Economic Review **92**(4): 1029-1043.

Bobonis, G. J. and R. Castro (2010). The role of conditional cash transfers in reducing spousal abuse in Mexico: Short term vs long term effects.

Bobonis, G. J., R. Castro, et al. (2009). Public Transfers and Domestic Violence: The Roles of Private Information and Spousal Control. Working paper 362, Department of Economics, University of Toronto.

Carrell, S. E. and M. L. Hoekstra (2010). "Externalities in the Classroom: How Children Exposed to Domestic Violence Affect Everyone's Kids." American Economic Journal: Applied Economics **2**(1): 211-228.

CDC (2003). Costs of Intimate Partner Violence Against Women in the United States. Atlanta, Georgia, Centers for Disease Control and Prevention: National Center for Injury Prevention and Control.

CEPAR (2005). Encuesta demografica y de salud materna e infantil: ENDEMAIN 2004, Informe final, Centro de estudios de poblacion y desarrollo social.

Coker, A. L., K. E. Davis, et al. (2002). "Physical and mental health effects of intimate partner violence for men and women." American Journal of Preventive Medicine **23**(4): 260-268.

Ellsberg, M. and L. Heise (2005). Researching violence against women: a practical guide for researchers and activists. Washington, DC, World Health Organization, PATH.

Ellsberg, M., L. Heise, et al. (2001). "Researching domestic violence against women: methodological and ethical considerations." Studies in family planning **32**(1): 1-16.

Ellsberg, M., H. A. F. M. Jansen, et al. (2008). "Intimate partner violence and women's physical and mental health in the WHO multi-country study on women's health and domestic violence: an observational study." The Lancet **371**(9619): 1165-1172.

Eswaran, M. and N. Malhotra (2011). "Domestic violence and women's autonomy in developing countries: theory and evidence." Canadian Journal of Economics/Revue canadienne d'économique **44**(4): 1222-1263.

Eswaran, M. and N. Malhotra (2011). "Domestic Violence and Women's Autonomy: Evidence from India." accepted at Canadian Journal of Economics.

Farmer, A. and J. Tiefenthaler (1997). "An economic analysis of domestic violence." Review of Social Economy **55**: 337-358.

Fernald, L. C. H. and M. Hidrobo (2011). "Effect of Ecuador's cash transfer program (Bono de Desarrollo Humano) on child development in infants and toddlers: A randomized effectiveness trial." Social Science & Medicine **72**(9): 1437-1446.

Fiszbein, A., N. Schady, et al. (2009). Conditional Cash Transfers: Reducing Present and Future Poverty. Washington D.C., The World Bank.

Flake, D. F. (2005). "Individual, family, and community risk markers for domestic violence in Peru." Violence against women **11**(3): 353.

García-Moreno, C., H. A. F. M. Jansen, et al. (2005). WHO multi-country study on women's health and domestic violence against women: initial results on prevalence, health outcomes and women's responses, World Health Organization.

García-Moreno, C., H. A. F. M. Jansen, et al. (2006). "Prevalence of intimate partner violence: findings from the WHO multi-country study on women's health and domestic violence." The Lancet **368**(9543): 1260-1269.

Hall, G. and H. A. Patrinos (2006). Indigenous peoples, poverty and human development in Latin America: 1994-2004, Palgrave Macmillan.

Hindin, M. J., S. Kishor, et al. (2008). "Intimate partner violence among couples in 10 DHS countries: Predictors and health outcomes." DHS Analytical Studies **18**.

Hornung, C. A., B. C. McCullough, et al. (1981). "Status relationships in marriage: Risk factors in spouse abuse." Journal of Marriage and the Family: 675-692.

Hughes, J. (2004). Gender, equity, and indigenous women's health in the Americas, PAHO.

Jewkes, R. (2002). "Intimate partner violence: causes and prevention." The Lancet **359**(9315): 1423-1429.

Jewkes, R., M. Nduna, et al. (2008). "Impact of stepping stones on incidence of HIV and HSV-2 and sexual behaviour in rural South Africa: cluster randomised controlled trial." BMJ: British Medical Journal **337**.

Koenen, K. C., T. E. Moffitt, et al. (2003). "Domestic violence is associated with environmental suppression of IQ in young children." Development and Psychopathology **15**(02): 297-311.

Lundberg, S. and R. A. Pollak (1993). "Separate spheres bargaining and the marriage market." Journal of Political Economy: 988-1010.

Lundberg, S. and R. A. Pollak (1996). "Bargaining and distribution in marriage." The Journal of Economic Perspectives: 139-158.

Macmillan, R. and R. Gartner (1999). "When she brings home the bacon: Labor-force participation and the risk of spousal violence against women." Journal of Marriage and the Family: 947-958.

Manser, M. and M. Brown (1980). "Marriage and household decision-making: A bargaining analysis." International Economic Review **21**(1): 31-44.

- McElroy, M. and M. Horney (1981). "Nash-bargained household decisions: Toward a generalization of the theory of demand." International Economic Review **22**(2): 333-349.
- Paxson, C. and N. Schady (2010). "Does Money Matter? The Effects of Cash Transfers on Child Development in Rural Ecuador." Economic Development and Cultural Change **59**(1): 187-229.
- Pence, E. and M. Paymar (1993). Education groups for men who batter: The Duluth model, Springer Publishing Company.
- Perova, E. (2010). Buying out of abuse: how changes in women's income affect domestic violence.
- Pollak, R. (2005). Bargaining power in marriage: Earnings, wage rates and household production, National Bureau of Economic Research Cambridge, Mass., USA.
- Pronyk, P. M., J. R. Hargreaves, et al. (2006). "Effect of a structural intervention for the prevention of intimate-partner violence and HIV in rural South Africa: a cluster randomised trial." The Lancet **368**(9551): 1973-1983.
- Ribero, R. and F. Sánchez (2005). "Determinants, Effects and Costs of Domestic Violence." Documento, CEDE **38**.
- Schady, N. and M. C. Araujo (2008). "Cash transfers, conditions, and school enrollment in Ecuador." Economía **8**(2): 43-70.
- Sternberg, K. J., M. E. Lamb, et al. (1993). "Effects of domestic violence on children's behavior problems and depression." Developmental psychology **29**(1): 44.
- Stevenson, B. and J. Wolfers (2006). "Bargaining in the Shadow of the Law: Divorce Laws and Family Distress." The Quarterly Journal of Economics, MIT Press **121**(1): 267-288.
- Straus, M. A. (1980). "Social stress and marital violence in a national sample of American families." Annals of the New York Academy of Sciences **347**(1): 229-250.
- Straus, M. A. and G. T. Hotaling (1980). The social causes of husband-wife violence. Minneapolis, University of Minnesota Press.
- Sullivan, C. M. and D. I. Bybee (1999). "Reducing violence using community-based advocacy for women with abusive partners." Journal of Consulting and Clinical Psychology **67**(1): 43.
- Tauchen, H. V., A. D. Witte, et al. (1991). "Domestic Violence: A Nonrandom Affair." International Economic Review **32**(2): 491-511.
- Vyas, S. and C. Watts (2009). "How does economic empowerment affect women's risk of intimate partner violence in low and middle income countries? A systematic review of published evidence." Journal of International Development **21**(5): 577-602.

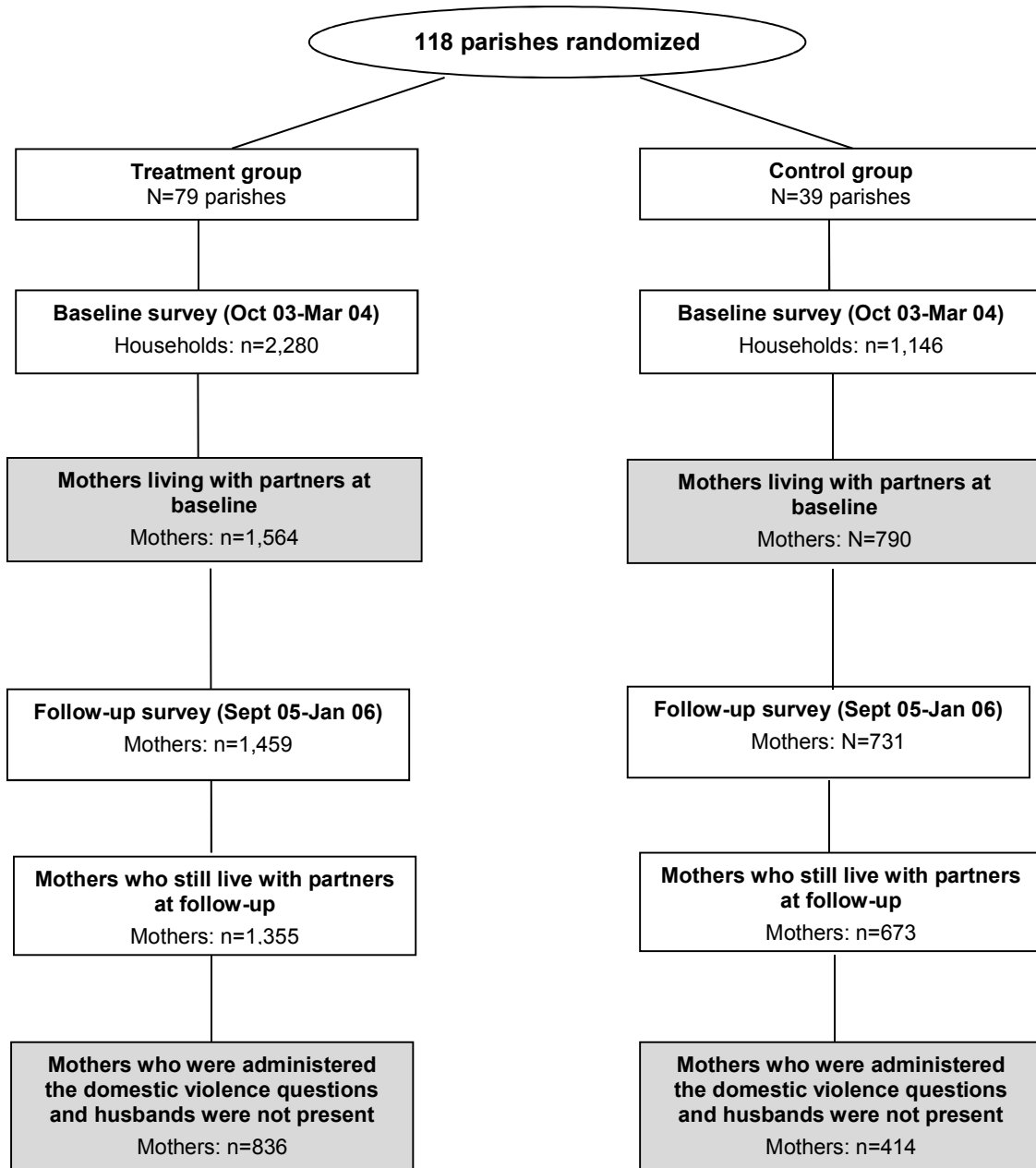


Wolfe, D. A., C. V. Crooks, et al. (2003). "The effects of children's exposure to domestic violence: A meta-analysis and critique." Clinical Child and Family Psychology Review **6**(3): 171-187.

Wooldridge, J. M. (2002). Econometric analysis of cross section and panel data, The MIT press.

# Figures

Figure 1: Flow of Participants



## Tables

**Table 2: Attrition Analysis**

	Dependent variable=1 if mother is... -		
	in follow-up	in follow-up + lives with partner	in follow-up + lives with partner + administered
Treatment	0.01 (0.01)	0.01 (0.02)	0.01 (0.03)
Observations	2354	2354	2354

Standard errors clustered at the parish level in parentheses. \* p<0.10 \*\* p<0.05 \*\*\* p<.01. -

Column 1: Dependent variable equals one if mother is in the follow-up. -

Column 2: Dependent variable equals one if mother is in the follow-up and is living with husband or partner. -

Column 3: Dependent variable equals one if mother is in the follow-up, is living with husband or partner, and is - administered the domestic violence questions without their husband present. -

**Table 3: Attrition analysis by baseline characteristics**

	Control Group			Treatment group			Difference	
	(1) Attrited	(2) In study	(3) P-value	(4) Attrited	(5) In study	(6) P-value	(7) Col(1)-Col(4)	(8) P-value
Mother's age	23.22	23.67	0.22	23.34	23.57	0.32	-0.11	0.72
Mother is married	0.45	0.47	0.64	0.40	0.45	0.04	0.05	0.09
Mother is indigenous	0.05	0.04	0.65	0.06	0.06	0.53	-0.01	0.45
Mother is Afro-Ecuadorian	0.11	0.10	0.61	0.10	0.10	0.84	0.01	0.56
Mother has no health insurance	0.93	0.95	0.16	0.94	0.94	0.87	-0.01	0.41
Yrs of schooling (Mother)	6.86	7.72	0.00	7.20	7.45	0.11	-0.34	0.08
Yrs of schooling (Partner)	6.86	7.39	0.02	6.97	7.28	0.05	-0.11	0.56
Schooling gap (Partner's schooling - Mother's schooling)	-0.01	-0.33	0.16	-0.24	-0.18	0.68	0.24	0.22
Mother has had a child die	0.08	0.07	0.80	0.06	0.07	0.45	0.01	0.38
Mother uses birth control methods	0.50	0.55	0.13	0.53	0.57	0.19	-0.04	0.26
Mother has poor health	0.10	0.09	0.66	0.09	0.08	0.99	0.01	0.47
Mother is currently pregnant	0.15	0.13	0.46	0.12	0.12	0.88	0.03	0.23
Number of children 0-5 yrs old	1.77	1.80	0.49	1.76	1.77	0.71	0.01	0.89
Asset index	-0.32	0.10	0.01	-0.16	0.06	0.04	-0.16	0.26
Kitchen is used for sleeping	0.27	0.25	0.37	0.29	0.26	0.20	-0.01	0.66
Urban	0.46	0.54	0.03	0.51	0.49	0.44	-0.05	0.10
<i>Husband or partner....</i>								
- is not affectionate with you	0.32	0.32	0.90	0.37	0.33	0.21	-0.05	0.28
- doesn't spend free time with you	0.45	0.42	0.54	0.35	0.37	0.58	0.10	0.03
- ignores you	0.30	0.31	0.79	0.32	0.34	0.59	-0.02	0.58
- doesn't allow you to study or work	0.31	0.41	0.05	0.34	0.31	0.35	-0.03	0.50
- doesn't allow you to see friends or family	0.21	0.21	1.00	0.24	0.24	0.81	-0.03	0.44
- yells at you	0.35	0.40	0.26	0.41	0.39	0.62	-0.06	0.17
- tells you your worthless	0.27	0.27	0.94	0.27	0.29	0.49	-0.00	0.97
- threatens to leave you	0.19	0.25	0.15	0.23	0.21	0.43	-0.05	0.22
- threatens to take your children away	0.30	0.29	0.80	0.29	0.27	0.50	0.01	0.73
Physical violence	0.29	0.30	0.83	0.27	0.27	0.95	0.02	0.70
Emotional violence	0.54	0.56	0.74	0.51	0.52	0.71	0.03	0.52
Controlling behaviors	0.51	0.57	0.22	0.53	0.55	0.44	-0.02	0.66

In columns 3 and 6 p-values are reported from t-tests on the equality of means for each variable between the "In Study" and "Attrited" groups. Column 7 reports the difference in means between the "Attrited" group in the control arm and the "Attrited" group in the treatment arm. Column 8 reports the p-values for the difference in means between the two "Attrited" groups. "In study" sample consists of mothers that were in the follow-up study are eligible and willing to be administered the domestic violence questions. "Attrited" refers to mothers that were living with their partners in the baseline survey but were not in the follow-up or were not administered the domestic violence questions at follow-up. Emotional violence indicator equals one if mother answered frequently or sometimes to any of the four emotional violence questions (see appendix for classification). Controlling behavior equals one if the respondent answered frequently or sometimes to any of the three controlling behavior questions.

**Table 4: Descriptive Statistics of study sample from baseline**

	N	Study Sample	Control	Treatment	P-value of diff between C and T
<b>Mother and Household Characteristics</b>					
Mother's age	1250	23.60	23.67	23.57	0.72
Mother is married	1250	0.45	0.47	0.45	0.53
Mother is indigenous	1250	0.05	0.04	0.06	0.38
Mother is Afro-Ecuadorian	1250	0.10	0.10	0.10	0.88
Mother has no health insurance	1250	0.94	0.95	0.94	0.36
Yrs of schooling (Mother)	1250	7.54	7.72	7.45	0.15
Yrs of schooling (Partner)	1250	7.31	7.39	7.28	0.53
Schooling gap (Partner's schooling - Mother's schooling)	1250	-0.23	-0.33	-0.18	0.46
Mother has had a child die	1250	0.07	0.07	0.07	0.97
Mother uses birth control methods	1249	0.56	0.55	0.57	0.60
Mother has poor health	1250	0.09	0.09	0.08	0.79
Mother is currently pregnant	1250	0.12	0.13	0.12	0.63
Number of children 0-5 yrs old	1250	1.78	1.80	1.77	0.51
Asset index	1250	0.08	0.10	0.06	0.77
Kitchen is used for sleeping	1250	0.25	0.25	0.26	0.65
Urban	1250	0.51	0.54	0.49	0.15
<b>Domestic violence indicators</b>					
<i>Husband or partner...</i>					
- is not affectionate with you	653	0.32	0.32	0.33	0.78
- doesn't spend free time with you	653	0.39	0.42	0.37	0.27
- ignores you	653	0.33	0.31	0.34	0.46
- doesn't allow you to study or work	653	0.34	0.41	0.31	0.01
- doesn't allow you to see friends or family	653	0.23	0.21	0.24	0.29
- yells at you	652	0.39	0.40	0.39	0.78
- tells you your worthless	653	0.29	0.27	0.29	0.60
- threatens to leave you	653	0.22	0.25	0.21	0.29
- threatens to take your children away	653	0.28	0.29	0.27	0.53
Physical violence	653	0.28	0.30	0.27	0.52
Emotional violence	652	0.53	0.56	0.52	0.42
Controlling behaviors	653	0.56	0.57	0.55	0.71

Study sample refers to mothers who are in the follow-up and are eligible and willing to answer the domestic violence questions. Only a subset of mothers answered the domestic violence questions at baseline. Emotional violence indicator equals one if mother answered frequently or sometimes to any of the four emotional violence questions (see appendix for classification). Controlling behavior equals one if the respondent answered frequently or sometimes to any of the three controlling behavior questions.

**Table 5: Average effect of the BDH on domestic violence**

	(1)	(2)	(3)	(4)	(5)	(6)
	Emotional	Controlling	Physical	Emotional	Controlling	Physical
Treatment	-0.01 (0.03)	-0.05* (0.03)	-0.01 (0.03)	-0.02 (0.03)	-0.06** (0.03)	-0.02 (0.03)
Yrs of schooling (Mother)				-0.01 (0.01)	-0.00 (0.01)	0.01 (0.00)
Yrs of schooling (Partner)				-0.01 (0.01)	-0.01** (0.00)	-0.01** (0.00)
Mother's age				0.01 (0.00)	-0.00 (0.00)	-0.01** (0.00)
Mother is married				-0.08** (0.03)	-0.02 (0.04)	-0.02 (0.03)
Mother is Afro-Ecuadorian				-0.10* (0.06)	-0.06 (0.05)	-0.03 (0.05)
Mother is indigenous				0.09 (0.07)	0.10* (0.06)	0.16*** (0.05)
Mother is currently pregnant				0.02 (0.05)	-0.07 (0.04)	-0.05 (0.04)
Mother has had a child die				-0.07 (0.05)	0.02 (0.05)	0.01 (0.05)
Number of children 0-5 yrs old				0.03 (0.02)	0.00 (0.02)	0.05*** (0.02)
Kitchen is used for sleeping				0.09*** (0.03)	0.01 (0.04)	0.06* (0.03)
Asset index				0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Asset index squared				-0.01*** (0.00)	-0.01** (0.00)	-0.00 (0.00)
Urban				-0.05* (0.03)	-0.04 (0.03)	-0.05* (0.03)
Constant	0.53*** (0.04)	0.55*** (0.04)	0.29*** (0.03)	0.54*** (0.11)	0.71*** (0.11)	0.39*** (0.10)
Observations	1236	1218	1246	1236	1218	1246

Standard errors clustered at the parish level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. All estimations contain province indicators.

**Table 6: Differential effect of BDH with respect to mother's education**

	(1)	(2)	(3)	(4)	(5)	(6)
	Emotional	Controlling	Physical	Emotional	Controlling	Physical
Treatment	0.02	-0.01	0.00	0.03	0.02	0.01
	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04
More than 6 yrs of schooling (Mother) X Treatment	-0.10*	-0.11	-0.04	-0.11*	-0.16**	-0.04
	-0.06	-0.07	-0.06	-0.06	-0.07	-0.06
More than 6 yrs of schooling (Mother)	0.08	0.07	0.08	0.09*	0.09	0.08
	-0.05	-0.06	-0.05	-0.05	-0.07	-0.05
Controls for interaction of treatment with indigenous indicator and asset index	No	No	No	Yes	Yes	Yes
Observations	1236	1218	1246	1236	1218	1246
Treatment effect for mothers with more than 6 yrs of school	-0.07*	-0.12**	-0.04	-0.08*	-0.14***	-0.03
	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)

Standard errors clustered at the parish level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All estimations control for baseline mother characteristics (age, indicator for whether mother is married, indicators for whether mother is indigenous or Afro-Ecuadorian, partner's years of schooling, indicator for whether mother has had a child die, indicator for whether mother is currently pregnant), and baseline household characteristics (asset index, asset index squared, urban, number of children 0-5 years old, whether kitchen is used for sleeping, province indicators).

**Table 7: Differential effect with respect to a mother's relative education by mothers with high and low education.**

	<u>Mother's with 6 yrs or less of school</u>			<u>Mother's with more than 6 yrs of school</u>		
	Emotional	Controlling	Physical	Emotional	Controlling	Physical
Treatment	0.09* (0.05)	0.02 (0.05)	0.01 (0.05)	-0.01 (0.05)	-0.11** (0.05)	-0.02 (0.05)
Mother has less schooling than partner X Treatment	-0.17** (0.07)	-0.05 (0.10)	-0.03 (0.08)	-0.26** (0.11)	-0.06 (0.10)	-0.08 (0.10)
Mother has less schooling than partner	0.13** (0.06)	0.05 (0.09)	0.04 (0.06)	0.24** (0.10)	-0.04 (0.09)	-0.01 (0.09)
Observations	668	653	672	568	565	574
Treatment effect for households where mother has less schooling than partner	-0.08 (0.06)	-0.03 (0.08)	-0.01 (0.06)	-0.27*** (0.09)	-0.17* (0.10)	-0.10 (0.08)

Standard errors clustered at the parish level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All estimations control for baseline mother characteristics (age, indicator for whether mother is married, indicators for whether mother is indigenous or Afro-Ecuadorian, partner's years of schooling, indicator for whether mother has had a child die, indicator for whether mother is currently pregnant), and baseline household characteristics (asset index, asset index squared, urban, number of children 0-5 years old, whether kitchen is used for sleeping, province indicators).



**Table 8: Baseline comparison of treatment and control stratified by education groups**

	<b>Mother's edu&gt;=Partner's edu</b>					
	6 yrs or less of school (N=424)			More than 6 yrs of school (N=450)		
	Control	Treat	P-value	Control	Treat	P-value
Mother's age	24.30	23.55	0.17	23.61	23.66	0.90
Mother is married	0.52	0.50	0.71	0.43	0.43	0.89
Mother is indigenous	0.05	0.08	0.28	0.02	0.02	0.92
Mother is Afro-Ecuadorian	0.06	0.06	0.88	0.10	0.17	0.06
Mother has no health insurance	0.94	0.91	0.32	0.96	0.94	0.36
Yrs of schooling (Mother)	5.74	5.73	0.89	10.71	10.46	0.23
Yrs of schooling (Partner)	5.17	5.09	0.66	7.78	7.49	0.31
Schooling gap (Partner's schooling - Mother's schooling)	-0.57	-0.64	0.65	-2.93	-2.97	0.87
Mother has had a child die	0.08	0.10	0.56	0.07	0.04	0.25
Mother uses birth control methods	0.45	0.49	0.39	0.66	0.64	0.71
Mother has poor health	0.11	0.10	0.56	0.07	0.06	0.72
Mother is currently pregnant	0.16	0.14	0.62	0.07	0.11	0.15
Number of children 0-5 yrs old	1.80	1.89	0.30	1.75	1.61	0.06
Asset index	-0.57	-0.73	0.45	0.79	0.68	0.57
Kitchen is used for sleeping	0.26	0.26	0.89	0.27	0.29	0.66
Urban	0.38	0.40	0.59	0.65	0.57	0.10
<b>Domestic violence indicators</b>						
Physical	0.29	0.27	0.69	0.35	0.27	0.24
Emotional	0.57	0.53	0.57	0.55	0.49	0.40
Controlling	0.56	0.56	0.99	0.56	0.55	0.90
	<b>Mother's edu&lt;Partner's edu</b>					
	6 yrs or less of school (N=251)			More than 6 yrs of school (N=125)		
	Control	Treat	P-value	Control	Treat	P-value
Mother's age	23.04	23.57	0.42	22.88	23.33	0.56
Mother is married	0.45	0.41	0.52	0.44	0.43	0.91
Mother is indigenous	0.09	0.07	0.60	0.02	0.06	0.39
Mother is Afro-Ecuadorian	0.09	0.08	0.72	0.22	0.06	0.01
Mother has no health insurance	0.96	0.96	0.99	0.95	0.99	0.21
Yrs of schooling (Mother)	4.48	4.35	0.61	9.00	9.25	0.39
Yrs of schooling (Partner)	8.36	8.20	0.68	11.80	11.95	0.72
Schooling gap (Partner's schooling - Mother's schooling)	3.88	3.85	0.94	2.80	2.70	0.76
Mother has had a child die	0.07	0.12	0.21	0.07	0.00	0.01
Mother uses birth control methods	0.48	0.50	0.74	0.63	0.70	0.45
Mother has poor health	0.11	0.11	0.87	0.05	0.07	0.63
Mother is currently pregnant	0.16	0.11	0.25	0.17	0.07	0.09
Number of children 0-5 yrs old	2.00	1.85	0.17	1.68	1.80	0.41
Asset index	-0.57	-0.50	0.79	0.98	1.75	0.04
Kitchen is used for sleeping	0.23	0.24	0.84	0.15	0.17	0.77
Urban	0.59	0.46	0.07	0.56	0.60	0.72
<b>Domestic violence indicators</b>						
Physical	0.26	0.33	0.49	0.18	0.19	0.93
Emotional	0.58	0.60	0.82	0.50	0.43	0.59
Controlling	0.65	0.60	0.69	0.55	0.45	0.49

P-values are reported from t-tests of the equality of means for each variable between treatment and control arms for each of the four groups in the study sample. Only a fraction of mothers in the study at follow-up answered the domestic violence questions at baseline, consequently, the sample size for the domestic violence questions at baseline is the following for each of the four groups: 1) 6 years or less of school, Mother's edu >= Partner's edu, N=241; 2) More than 6 years of school, Mother's edu >= Partner's edu, N=231; 3) 6 years or less of school, Mother's edu < Partner's edu, N=117; 4) More than 6 years of school, Mother's edu < Partner's edu, N=64.

## Appendix

**Table A1: Psychological and Physical Violence Questions (English translation)**

Q64. When two people get married or live together they share good and bad moments. I am going to read to you some actions or attitudes of husbands or partners. Tell me if the situation occurs in your relationship many times, sometimes, or never.	Answer				Category
	Many times	Sometimes	Never	NA	
Your husband spends his free time with you					Emotional Support
He is affectionate with you					Emotional Support
He ignores you or he is indifferent with you					Controlling Behavior
He does not allow you to study or work					Controlling Behavior
He does not allow you to see your friends or family					Controlling Behavior
He yells at you					Emotional Violence
He says things like "You are worthless" or similar phrases					Emotional Violence
He tells you: "I am tired of you, I am thinking of leaving you"					Emotional Violence
He tells you: "If you leave me I will take our children"					Emotional Violence
Q66. Has your husband or partner ever pushed you, hit you or attacked you physically?	Yes	No	Not sure	NA	Physical violence
Q67. Does your husband or partner physically attack you frequently or only sometimes?	Frequently	Sometimes	Not sure	NA	Physical violence

\*NA indicates no answer

**Table A2: Average effect of the BDH on all 7 psychological violence questions**

	Does not allow you to see friends or family	Does not allow you to study or work	Ignores you	Yells at you	Tells you your worthless	Threatens to leave	Threatens to take children
Treatment	-0.06*** (0.02)	-0.05* (0.03)	-0.04 (0.03)	-0.03 (0.03)	-0.03 (0.03)	-0.03 (0.03)	-0.03 (0.02)
Observations	1245	1229	1238	1246	1247	1245	1240

Standard errors clustered at the parish level. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . All estimations control for baseline mother characteristics (age, indicator for whether mother is married, indicators for whether mother is indigenous or Afro-Ecuadorian, partner's years of schooling, indicator for whether mother has had a child die, indicator for whether mother is currently pregnant), and baseline household characteristics (asset index, asset index squared, urban, number of children 0-5 years old, whether kitchen is used for sleeping, province indicators).

**Table A3: Heterogeneous effect with respect to mother's education for all 7 psychological violence questions**

	Does not allow you to see friends or family	Does not allow you to study or work	Ignores you	Yells at you	Tells you your worthless	Threatens to leave	Threatens to take children
Treatment	-0.04 (0.03)	0.04 (0.04)	0.01 (0.04)	0.04 (0.05)	-0.00 (0.04)	0.03 (0.04)	-0.02 (0.04)
More than 6 yrs of schooling (Mother) X Treatment	-0.05 (0.06)	-0.16*** (0.06)	-0.13** (0.06)	-0.16*** (0.06)	-0.06 (0.06)	-0.11** (0.05)	-0.04 (0.06)
More than 6 yrs of schooling (Mother)	0.02 (0.05)	0.08 (0.05)	0.08 (0.05)	0.09* (0.05)	0.03 (0.04)	0.10** (0.04)	0.02 (0.04)
Observations	1245	1229	1238	1246	1247	1245	1240
Treatment effect for mothers with more than 6 yrs of school	-0.09** (0.04)	-0.12*** (0.04)	-0.12*** (0.04)	-0.12*** (0.04)	-0.06 (0.04)	-0.09** (0.04)	-0.05 (0.04)

Standard errors clustered at the parish level. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. All estimations control for baseline mother characteristics (age, indicator for whether mother is married, indicators for whether mother is indigenous or Afro-Ecuadorian, partner's years of schooling, indicator for whether mother has had a child die, indicator for whether mother is currently pregnant), and baseline household characteristics (asset index, asset index squared, urban, number of children 0-5 years old, whether kitchen is used for sleeping, province indicators).