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Public Transfers and Domestic Violence: The Roles of Private Information and Spousal Control

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Public Transfers and Domestic Violence: The Roles of Private Information and Spousal Control*

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Abstract: Existing economic theories of the family suggest that public transfer programs in which funds are targeted to women, by improving women's bargaining position in the household, may decrease the incidence of spousal abuse. We study this prediction empirically using data from a unique survey in Mexico to examine the impact of the Oportunidades conditional cash transfer program on spousal abuse rates and threats of violence. We find that although women in beneficiary households are 33 percent less likely to be victims of physical abuse than women in comparable non-beneficiary households, they are more likely to receive violent threats with no associated physical abuse. We re-interpret a model of decision-makers' interactions with asymmetric information in the male partners' gains to marriage to document how increases in female partners' socioeconomic opportunities can lead to an increase in husbands' use of violent threats with no associated physical abuse – predictions consistent with the empirical evidence.

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I. Introduction

In marriage and multiple other settings, violent acts are commonly considered as coercive instruments at the disposition of individuals for the control of resources or other individuals' behaviors (Tauchen, Witte, and Long 1991; Bloch and Rao 2002; Felson and Messner 2000). Given the concerns that violence and coercion represent limitations on the freedom of an individual (Sen 1999), it is of particular concern that marital violence is quite prevalent across societies. For instance, in the context of our study – rural Mexico – seven percent of women in a marital union report having been victims of physical abuse inflicted by their male partners at some point during the previous twelve months (INEGI 2004). In other countries such as Haiti and Zambia, the annual incidence of physical spousal abuse against adult females rises to approximately a quarter of the population (Kishor and Johnson 2004).

The mere existence of spousal abuse represents a violation of women's rights and freedoms. Moreover, in addition to these ethical concerns, policy advocates have estimated the costs of domestic violence in developed country contexts, in terms of medical care and declines in productivity, at approximately $5.8 billion in the United States and at approximately $4 billion in Canada (Greaves, Hankivsky, and Kingston-Riechers 1995; CDC 2003). There is also an increasing recognition that domestic violence influences the levels of human development of the next generation. Silverman et al. (2006) and Aizer (2007) find evidence that violence against pregnant women negatively impinge on the health of their children at birth. Additionally, research in the psychology and economics literatures finds that children exposed to domestic violence are more likely to suffer from a number of social and emotional problems, including aggressive behavior, depression, anxiety, decreased social competence, and diminished academic performance.[1] This indicates that, as other forms of violent behavior, spousal abuse is an important and global public policy concern.

Could policy mechanisms – social insurance policy intended to improve the economic condition and opportunities for women in particular – help reduce the incidence and severity of spousal abuse? A large group of less developed countries have introduced conditional cash transfer (CCT) programs – poverty alleviation programs which provide funds to households in exchange for certain actions such as children's school attendance, school

[1] Silverman et al. (2006) and Aizer (2007) find evidence that violence against pregnant women negatively affects the health of their children at birth, possibly through effects on the developing fetus via blunt trauma to the maternal abdomen. See Edleson (1999), Wolfe, et al. (2003), Fantuzzo & Mohr (1999), and Koenen, et al. (2003) for research in the psychology literature documenting the social and emotional problems that children exposed to domestic violence suffer from. Carrell and Hoekstra (2009) find that children from troubled families significantly decrease their classroom peers' academic achievement levels and significantly increase the misbehavior of others in the classroom. See Kishor and Johnson (2004) for an earlier survey of this literature and patterns in a number of less developed countries.

performance, and preventive health care visits (Rawlings and Rubio 2003; Maluccio and Flores 2004). A common feature of these programs is that funds are targeted to adult women, mothers of the target child population. The basis for this gender-specific targeting is a growing consensus among scholars and policymakers that targeting resources to women may have a myriad of benefits, from promoting gender equity and female empowerment within the household and in the community, to disproportionately improving children's human development (e.g., Thomas 1990; Schultz 1990; Duflo 2003; 2005; World Bank 2003; 2007). However, a potential unintended consequence of the program (and of the gender-based targeting, in particular) may be an increased incidence of domestic violence, since unexpected changes in women's economic opportunities may increase the incentives for male partners to use violence or threats of violence to (re)gain control over household resources or decision-making (McCloskey 1996; Kimerling and Baumrind 2004).[2]

The objective of this paper is twofold. First, we provide evidence of the impacts of the Mexican Oportunidades CCT program on the incidence of male-to-female spousal violence. To accomplish this, we use data from a recently available nationally-representative survey, the National Survey on Relationships within the Household (ENDIREH 2003), which includes detailed information on the prevalence of male-to-female spousal abuse and threats of violence against women. We define violence from the survey measures as including physical, sexual, and emotional abuse, measures of spousal violence that allow us to better characterize the real extent of spousal abuse in this population.

Constructing comparable groups of beneficiary and non-beneficiary households within each village to minimize potential omitted variable and selection biases, we find that women in beneficiary households are 33 percent less likely to be victims of physical abuse than non-beneficiary women, impacts that may result from an improvement in women's power within the household. However, these women are 60 percent more likely to receive threats of violence and to be victims of emotional violence with no associated physical abuse. Together, these findings provide some evidence against traditional economic theories of the family, which generally claim that these transfer programs, by improving women's bargaining position in the household, may decrease the incidence of both physical and emotional spousal abuse.

[2] There is a burgeoning literature on these programs' impacts, and the gender-based targeting of these transfers in particular, on the levels of female empowerment, the allocation of household resources towards investments in children, child well-being, and marital transitions (Attanasio and Lechène 2002; Djebbari 2005; Rubalcava, Teruel, and Thomas 2008; Bobonis 2009a,b).

The findings are consistent with a model of asymmetric information in household bargaining involving spousal abuse, in which male partners may use threats of violence as instruments of coercion to appropriate or (re)gain control over household resources or decision-making (i.e., extract rents) from their female counterparts. In this set-up, a re-interpretation of Bloch and Rao (2002)'s model of domestic violence, male partners have private information regarding the 'gains to marriage', such as their own private income or their status within the household based on traditional gender roles. Because of this private information, they can use threats of abuse to coercively demand transfers from their wives, and strategically use violence based on wives' decision to abide to the act of coercion.[3] The model predicts that, if marginal increases in women's socioeconomic opportunities lead to an increase in the amount of rents that husbands are willing to extract, this will lead to an increase in the threat of spousal abuse with no associated physical violence, and a reduction in the actual incidence of physical abuse.

The findings outlined in the paper have important policy implications. Conditional cash transfer programs are currently one of the main poverty-alleviation tools in Latin America and the Caribbean, with programs providing transfers to mothers in Brazil, Colombia, Honduras, Jamaica, and Nicaragua, among many (Rawlings and Rubio 2003; Maluccio and Flores 2004). However, although women's empowerment is one of the programs' objectives, domestic violence – with its potential negative implications in terms of both women and child welfare – may be an unintended consequence. The evidence presented in the paper provides a mixed view of their effectiveness in improving women's empowerment within the household, since the programs may increase the likelihood of threats of physical violence that may in turn compromise women's emotional health and other aspects of their or other household members' wellbeing.

The study also contributes to a growing literature on how, due to the incomplete nature of marital contracts, imperfect enforceability (e.g., limited commitment) and information asymmetries among partners within the household may affect the Pareto-efficiency of intra-household resource allocation decisions.[4] Ligon (2002), Basu (2006), and Lundberg and Pollak (2003) explore the implications of limited commitment in dynamic bargaining models of the family and provide conditions under which household allocation decisions diverge from full Pareto

[3] This argument is based on sociological theories of "male backlash". These predict that as women's economic opportunities improve, violence against them may increase because men feel their traditional gender role threatened (e.g., Macmillan and Gartner 1999).

[4] A large empirical literature assesses the extent of Pareto-efficiency in intra-household resource allocation decisions. Evidence from a number of studies in developed countries suggests that the intra-household allocation of resources is Pareto-efficient (Browning et al. 1994; Browning and Chiappori 1998; Chiappori, Fortin, and Lacroix 2002). However, Udry (1996), Dercon and Krishnan (2000), Duflo and Udry (2004) find evidence inconsistent with Pareto-efficiency among rural households in Africa, although evidence from other West African settings (Akresh 2005; Rangel and Thomas 2005) and from rural Mexico (Bobonis 2009) suggests that the results may not be as generalizable as previously thought.

efficiency. Rasul (2008) finds evidence consistent with limited commitment in fertility decisions among partners in Malaysia, whereas Jacoby and Mansuri (2006) find evidence of parental household strategies to limit the extent of ex-post marital discord among arranged marriages in Pakistan. Finally, Ashraf (2008) and Bloch and Rao (2002) respectively address the role that information asymmetries among partners in their incomes and levels of satisfaction affect household's savings decisions and spousal violent behaviors. The present study complements the literature by showing how male partners' private information can help them gain undue influence in the behavior and welfare of other household members.

The paper is structured as follows. In Section II we provide a brief description of the context of study. Section III discusses the theoretical framework, the main predictions of the model, and its relationship to the existing literature. We present a concise description of the Oportunidades program, its implementation, as well as the data used in the analysis in Section IV. In Section V, we then describe our identification strategy and discuss how it avoids the identification pitfalls. The main estimates are reported in Section VI, and Section VII concludes.

II. Household Income Distribution Patterns and Gender Roles in Household Activities in Rural Mexico

Gender inequality in familial relations is widespread in rural Mexico. It pervades multiple realms of everyday life in the Mexican countryside – from landholding patterns, to allocation decisions within the household, to various other areas of economic and social interaction (e.g. Wolf 1959; Elmendorf 1972; Chiñas 1992). This may have implications for whether and how income-generating opportunities of women may influence both the distribution of resources within the household and individuals' perceptions of their social roles and status within the household.

Of particular interest to our work, anthropologists have documented that partners have differential claims on the various forms of income earned by household members. Among most low-income Mexican households, male partners tend to control their own earned income, while contributing to a household common fund used to cover basic household expenditures (e.g., Benería and Roldán 1987). This body of literature argues that this is because men, who in many cases make significantly greater cash incomes than their female counterparts, may try to keep information about their income levels private, and thus hold back significant amounts for personal consumption. This strategy may allow male partners to control how much they contribute to household expenses and to what specific ends. In contrast, most female partners' incomes go entirely into the household's common fund; social

norms, or an ideology of 'maternal altruism', may oblige them to devote their earnings to meet collective rather than individual consumption needs (Whitehead 1981; Roldán 1987). Husbands can also raid the pool for additional personal spending on items such as alcohol while vetoing other household expenditures such as basic household needs (Benería and Roldán 1987). It is considered by many female partners that disagreement over the amount of a husband's personal income is one of the leading causes of domestic violence between spouses (Castro 2004).

That said Mexico is in the midst of several transitions with multiple consequences for the assignment of household gender roles in the country. For instance, women's employment opportunities have increased dramatically, partly as a result of the integration of Mexico to the international economy as well as the growth of its tertiary and "maquiladora" sectors (Oliveira and Ariza 1997; Ariza and Oliveira 2001). Together with the cultural change that Mexican society is currently undergoing, these transitions have produced a partial redistribution of gender roles with respect to household activities, although mainly within families living in metropolitan areas (Schmuker 1998; García and de Oliveira 2006). Such redistribution includes a growing number of women entering the labor force, and a slight increment of men's participation in household productive activities.

These dramatic changes notwithstanding, sociological research has shown that working wives are not more empowered within the household than non-working wives are.[5] Mexican women still experience very low levels of autonomy and a rather limited participation in household decision-making processes (Casique 2001). Thus, roles of women may be changing, but they may be doing so rather slowly; these changes may certainly be even slower among the poorest sectors of the country, basically, although not exclusively, indigenous households and the rural population (Vázquez García 1997). Moreover, evidence from the two recent national surveys on domestic violence shows that female wage earners face a 30 percent higher risk of suffering any form of intimate partner violence (physical, sexual or emotional abuse), as compared to non-working women. This finding seems to confirm the evidence which has been accumulating recently, in agreement with sociological theories of "male backlash" (discussed in Section III.B), showing that the fact that women have an employment might constitute a threat to many men, either because those women have an income of their own, or because having a job requires diverting time and attention outside the household, or a combination of factors of this nature (Castro, Riquer and Medina 2006; Castro and Casique 2008).

[5] Aizer (2007) has highlighted a concern with these findings: it could be labor market conditions, and not necessarily the actual employment of women, which would influence female partners' levels of empowerment within the household.

III. Theoretical Framework

The income distribution and resource allocation patterns described above are consistent with the motivations for the growing theoretical literature cited above arguing that intra-household resource allocation decisions may be Pareto inefficient as a result of the imperfect enforceability of marital contracts (Ligon 2002; Lundberg and Pollak 2003; Basu 2006), such as conflict over partners' contributions to household public goods (Lundberg and Pollak 1993), or due to information asymmetries and spousal abuse among partners within households (Bloch and Rao 2002). We take these arguments into consideration in the theoretical framework that motivates our empirical analysis: as a result of the CCT program, the equilibrium level of violence will depend on the male partner's private information regarding his resources and his perceptions of status within the household and his ability to 'renegotiate' household allocation decisions. It contrasts with existing theories of spousal violence in the economics literature: complete information non-cooperative bargaining models in which female partners' incomes, economic opportunities, and financial resources outside the marriage more generally, influence the woman's threat point and thus reduce the level of violence in equilibrium.

A. Husband's Private Information, Threats of Violence, and Spousal Abuse

The following theoretical framework adapts Bloch and Rao (2002)'s asymmetric information (i.e., signaling) theory of domestic violence in household bargaining to model how male partners may use threats of violence as instruments to appropriate resources from or influence behaviors of their female counterparts. Essentially, we provide a different interpretation to their model of terror as a bargaining instrument across families. In this set-up, male partners have private information regarding their gains to marriage – their private resources and perceptions of status within the household. Because of this private information, they can use threats of abuse to coercively demand transfers from their wives, and strategically use violence based on wives' decisions to abide to the act of coercion.

We will analyze the distribution of resources in a two decision-maker household where h and w respectively denote the two agents: husband and wife. The union is formed based on the potential gains to marriage, which may arise from specialization in home and market production, the joint production or provision of household public goods, and the feasible division of the marital surplus. The union leads to indirect utility levels for each partner given by $U_h = u_h(I_h, x_h, x_w, \theta)$ and $U_w = u_h(I_w, x_h, x_w)$, where I_h, I_w represent the husband's and the wife's

incomes; x_h, x_w, denote vectors of characteristics of each partner; and θ is the husband's private information that influences his gains to marriage. Assume that the indirect utility functions are strictly increasing in all their arguments and are strictly concave in income.

We assume that the negotiation game has the following structure:

Stage 1: The quality of the match is revealed, both public (z) and private (θ) components;

Stage 2: The husband chooses whether to threaten his wife with the use of physical violence, demands a transfer;

Stage 3: The wife responds to the husband's demand by accepting or rejecting to provide the transfer demanded;

Stage 4: The husband chooses whether to use physical violence or not; if so, the partnership's equilibrium decision becomes non-cooperative and the allocation Pareto inefficient.

We next discuss in detail the assumptions made in the structure of the game. In the first stage, the quality of the match is revealed. This includes a public component, $\mathbf{z}$, observable by both partners, and a private component, θ, which is only observed by the husband. We assume that the private component is a dichotomous variable, with value 1 for husbands with high private gains to marriage and 0 for those with privately low gains to marriage. The prior probability that the husband experiences low gains, $\Pr(\theta = 0)$, is a function of the observable characteristics of the marriage, $p(z)$, with $p'(\mathbf{z}) < 0$.

In the following stage, the husband makes the decision whether to threaten with physically abusing his wife. Each partners respectively suffers a utility loss measured by $C_h(\theta)$ and C_w if the threat of violence is made. This relies on the idea that threats of physical violence are actual incidences of emotional violence, and these may be harmful to both men's and women's mental health or emotional wellbeing. Also in this stage, we assume that the husband has all the bargaining power, and makes a take-it-or-leave-it demand of a transfer t to his wife; this transfer may be in the form of resources or in actions or behaviors of the female partner.[6] Following the possible threat and demand, the wife responds by accepting or rejecting the offer. For simplicity, we further assume that divorce is too costly for the wife and she will prefer to pay a transfer than divorce, as marital dissolution rates are extremely low for this population (Bobonis 2009b).

[6] This assumption, in which bargaining power radically shifts in favor of the man once the woman commits herself to marriage, may represent the true extent of women's bargaining power in many traditional societies, in which women's formal legal rights are often weak and divorce is highly stigmatized (Bobonis 2009a,b; Jacoby and Mansuri 2006).

In the final stage of the game, the husband chooses whether or not to actually use physical violence to punish his wife's potential deviant behavior, which entails the destruction of a share of the marital surplus. In the event that the husband uses violence, the household reaches a non-cooperative "separate spheres" equilibrium that may additionally reduce the marital surplus (Lundberg and Pollak 1993). If this were the case, the partners enjoy more limited joint production or consumption possibilities from the marriage, and obtain discounted utilities denoted $V_h = v_h(I_h, x_h, x_w)$ and $V_w = v_w(I_w, x_h, x_w)$, both increasing in its arguments and strictly concave in income.

Following Bloch and Rao (2002), the following assumptions ensure a uniquely determined separating perfect Bayesian equilibrium of the game, satisfying the Cho-Kreps intuitive criterion. This equilibrium leads to a separation of the threats and acts of violence by male partners who privately know their determinants of high and low gains to marriage.

Assumption 1: For any level of male partners' income (I_h) and partners' socio-economic characteristics (x_h, x_w), $u_h(I_h, x_h, x_w, \theta=1) > v_h(I_h, x_h, x_w)$ and $u_h(I_h, x_h, x_w, \theta=0) < v_h(I_h, x_h, x_w)$.

Assumption 2: The costs of making threats of violence for male partners with high levels of privately-known gains to marriage are infinitely large: $C_h(1) = \infty$. In contrast, those with low privately-known gains to marriage experience costs $C_h(0) = \eta$, where η is a random variable with cumulative distribution function F_η on $[0, \infty)$.

Assumption 3: The female partner strictly prefers to suffer threats of violence and transfer a share of the gains to marriage than to reject the partner's demand, suffer physical abuse, and reach a Pareto-inefficient intra-household resource allocation outcome: $u_w(Y_w - t, x_h, x_w) - C_w \geq v_w(Y_w, x_w)$.

The characteristics of the ensuing equilibrium allow us to elucidate whether increases in women's socioeconomic opportunities may affect their partner's violent behavior. First, the wife's decision to accept or reject the demand will depend on the expected disutility from paying a transfer to a husband who may have high private gains to marriage – based on her posterior beliefs regarding the probability that the husband is the low-gains type, μ (given the threat of violence) – relative to the prospects of suffering physical abuse if she rejects the demand. Formally, the wife will accept to pay any transfer payment demand such that:

(1) $$u_w(Y_w - t, x_h, x_w) \geq \mu\, v_w(Y_w, x_w) + (1-\mu)\, u_w(Y_w, x_h, x_w),$$

and the maximal amount that the wife is willing to pay to her husband, $t^w(\mu)$, is the value such that condition (1) holds with equality.

Next we consider the husband's incentive to make threats of violence and the determinants of the amount of transfer demanded. In equilibrium, husbands with high private gains to marriage never make threats, since the cost of threatening the wife with physical abuse is infinite, by assumption. Among those with low gains to marriage, individuals whose cost of threats of violence is low enough will demand the highest possible transfer from their spouses, $t^w(1)$, and alternatively those whose costs of threatening is too high will not make transfer demands and will behave so as to achieve the Pareto efficient intra-household allocation equilibrium. Specifically, there will be a threshold value of the cost of making threats (η^*) for which this type of husband is indifferent between making the threat and obtaining the transfer $t^w(1)$ and using violence. The value of η^* is determined by:

(2) $$\eta^* = u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h).$$

Therefore, the probability of violence given that the husband is of the 'low gains to marriage' type is $\Pr[\eta < \eta^*] = F_\eta(\eta^*)$, and the unconditional probability that the husband will be violent is:

(3) $$B(Y_h, Y_w, x_h, x_w, z) = p(z)\, F_\eta[u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h)].$$

Equation (3), in combination with the equality condition based on (1), allows us to assess to what extent can a change in women's income affect the incidence of threats of violence and physical abuse in the relationship. A marginal increase in the wife's income will lead to a change in the maximal transfer amount demanded by her partner that will make her indifferent between accepting and rejecting the latter. By implicit differentiation of equality condition (1):

(4) $$\frac{\partial t^w}{\partial Y_w} = 1 - \left[\frac{\frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) + \mu\left(\frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w) - \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \right)}{\frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w)} \right].$$

It is clear from equation (4) that the marginal change in the transfer amount that the male partner demands, as a response to a marginal increase in the wife's income ($\partial t^w / \partial Y_w$), may increase or decrease depending on the wife's expected utility changes in the different scenarios. In particular, the transfer amount demanded by the husband will increase if the wife's expected utility gain from acquiescing and providing the transfer, given the marginal increase in income, is greater than the utility gain from not doing so, or:

$$(5) \qquad \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) - \mu\left[\frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w)\right] < \frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w) - \mu\left[\frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w)\right].$$

It is a priori unclear whether this will be the case, since the Pareto inefficient equilibrium will involve unknown levels of spousal violence which may affect women's utility levels limitedly or substantially in the case of suffering physical abuse.

The change in the demanded transfer amount in turn leads to a change in the share of male partners who make threats of physical violence:

$$(6) \qquad \frac{\partial B}{\partial Y_w} = p(z) f_\eta \frac{\partial u_h}{\partial I_h}(Y_h + t^w(1), x_h, x_w, \theta = 0) \frac{\partial t^w}{\partial Y_w}.$$

As shown in condition (6), the probability that the husband uses threats of violence increases if the level of the demanded transfer increases as a result of an increase in the wife's income (if condition [5] holds). In contrast, the probability that the male partner will perpetrate physically violent actions will decrease, since the partner who chooses to make threats and thus not use physical violence, now faces a higher cost of violence ($\eta^*(t^w(Y_w))$).[7]

Interestingly, the model predicts opposing effects for the incidence of threats of spousal abuse without actual physical abuse and the incidence of physical abuse. A marginal increase in women's income will lead to an increase [decrease] in the threat of spousal abuse with no associated spousal physical abuse if the increase in

[7] This result is consistent with the traditional joint-cost hypothesis in non-cooperative bargaining models, in which increasing the size of the surplus increases the opportunity cost for the aggressor to use violence, therefore increasing the amount demanded in bargaining (e.g., Kennan 1980).

women's income leads to an increase [decrease] in the transfer demanded and a *decrease* [increase] in the actual use of spousal abuse if $\partial t^w / \partial Y_w > 0$ [$\partial t^w / \partial Y_w < 0$]. This result is driven by the fact that the increase in the transfer demanded will lead to a change in the threshold value of the husband's cost of using threats, increasing the proportion of individuals who strictly prefer to exercise threats of violence and extract resources from their partners, as opposed to using violence and achieving the Pareto inefficient allocation. In the empirical section, we test these empirical predictions of the model using the variation in women's socioeconomic opportunities driven by the public transfer program. However, preceding the detailed discussion of the data and the research design, we first contrast our framework to the existing literature.

B. Contrast with Existing Theories of Spousal Violence

Spousal violence is generally explained either as an expression of incidents within the couple in which conflict occasionally gets out of hand – not gender oriented – or as a manifestation of males' systematic interest in preserving their power over their female partners, or patriarchal terrorism. The first approach, known as the family violence perspective, thinks of violence as an intrafamily phenomenon to which all members of the family are equally exposed, both as perpetrators and victims (Gelles 1974; Straus 1983). Hence, socialization into violence — to which children are exposed since early stages of life — is seen as one of the main channels through which violence is reproduced across successive generations (Kurz 1989).

The second framework, known as the gender or feminist perspective, considers violence as an instrument for the control of the victim's resources or behavior (e.g., Johnson 1995). This is the framework commonly discussed in the economics literature (e.g., Tauchen et al. 1991; Bloch and Rao 2002). There is important research aimed at demonstrating that the control motive explains both threats of violence and physical violence against wives (Felson and Messner 2000). From this perspective, scholars have pointed out the need to differentiate between several types of violence that might exist within a couple or a family. An influential synthesis by Johnson (2006) distinguishes between four different types of intimate partner violence: *intimate* terrorism, in which the individual is violent and controlling, and the partner is not; *violent resistance*, in which the individual is violent but not controlling, and the partner is the violent and controlling one; *situational couple violence* in which the individual is

violent but neither the individual nor the partner is violent and controlling; and *mutual violent control*, in which both the individual and the partner are violent and controlling (Johnson 2006).[8]

Theories of spousal violence in the economics literature focus on non-cooperative bargaining models in which female partners' incomes, and financial resources for women outside the marriage more generally, influence the woman's threat point and thus reduce the level of violence in equilibrium (Farmer and Thiefenthaler 1997; Tauchen et al 2001). As mentioned above, Bloch and Rao (2002) have more recently modeled spousal violence in India as a bargaining instrument used by male partners to extract larger dowry payments from the bride's family. However, the bargaining takes place between the families of the bride and groom, rather than within the couple itself.[9] This bargaining approach contrasts with the gender perspective's theory of "male backlash", which predicts that as women's economic opportunities – and thus their economic independence – increase, violence against them might increase because men feel their traditional gender roles threatened. This is an argument that we take into consideration in the theory exposited above.

Other theoretical work in economics also addresses certain stylized facts of domestic violence, including the fact that battered women are not unlikely to return to an abusive relationship even after seeking help.[10] In a model by Farmer and Thiefenthaler (1996), battered women use shelters and other support services to signal to the abuser their ability to leave the relationship, which changes their threat-point and may reduce their toleration for physical abuse. Aizer and Dal Bó (2007) model this pattern utilizing a framework of time-inconsistent preferences – women who leave the relationship may require a 'commitment device' to ensure that they escape the violent relationship and criminally punish the abuser, as otherwise they may drop charges and return to the abusive relationship. Finally, Pollak (2004) addresses the intergenerational transmission of violent behavior within the household. In the model, individuals raised in violent homes are more likely to marry partners who were also raised in violent homes. Thus, assortative matching may increase the equilibrium level of violence. As will be seen in the empirical methodology and results sections, these theories influence our identification strategy as well as our concerns for empirical validity.

C. Relationship to the Empirical Literature

[8] For details on the sociological literature, see also the review in Castro (2004).
[9] See the excellent survey of the literature in Aizer (2007).
[10] See Bowlus and Seitz (2006) for an exception to this common belief in the Canadian context.

It is not obvious that the causal relationship between female socioeconomic opportunities and spousal violence will be negative – as highlighted by the theories of male backlash. Yet evidence from a number of studies in developed countries suggests that this is the case. In an influential study, Stevenson and Wolfers (2006) examine how a particular change in women's opportunities outside current marriages - unilateral divorce legislation in the United States - changed patterns of family violence and whether the option reduced female suicide and spousal homicide rates. They find evidence consistent with unilateral divorce laws substantially reducing all of the above outcomes. In more recent work, Aizer (2007) examines the causal impact of local labor market conditions for women on the extent of spousal abuse using data on female hospitalizations for assault in California, and finds particularly strong effects: an improvement in local labor market conditions faced by women over the period 1990-2003 explains ten percent of the decline in violence against women witnessed over this period.

The evidence for couples in less developed countries is more mixed. For instance, Panda and Agarwal (2005) find that women who own property are less likely to be victims of spousal violence in India, but González-Brenes (2005) does not find a relationship between female income shares and the probability of violence for women in several East African countries. Also, a recent evaluation of the urban component of the Oportunidades program in Mexico found that women in beneficiary households do not face a higher (or lower) risk of domestic violence than non-beneficiary households (Rivera, Hernández and Castro 2006). And a recent related paper shows evidence of heterogeneous impacts of the Oportunidades program on domestic violence – small transfers related to the program decrease alcohol consumption-related violence by 37 percent for all households, whereas large transfers increase the aggressive behavior of husbands with traditional views of gender roles (Angelucci 2008). Finally, note that, due to data limitations, none of these studies is able to examine whether male partners strategically use threats of violence – in an instrumental manner - to coerce their female partners in particular ways or violently force a different allocation of resources within the household.

IV. Oportunidades Program, Data, and Social Context

A. Overview of the Oportunidades Program

In 1997, the Mexican government initiated a conditional cash transfer program named PROGRESA – renamed "Oportunidades" in 2001 under the Fox Administration – aimed at alleviating poverty and improving the human development of children in rural Mexico. The program targets the poor in marginal rural communities, where

40 percent of the children from poor households drop out of school after the primary level. It provides cash transfers to the mothers of over 2.6 million children conditional on school attendance, health checks, and participation in health clinics. The education component of Oportunidades consists of subsidies provided to mothers, contingent on their children's regular attendance at school.[11] These cash transfers are available for each child attending school in grades three to nine of primary and lower secondary school, and range from 70 to 255 pesos per month, depending on the gender and grade level the child is attending (with a maximum of 625 pesos per month per family in 1998). The health and nutrition components consist of cash transfers of approximately 12 pesos per month and nutritional supplements targeted at 4-months to 2-years, pregnant and breast-feeding women, and children aged 2-5 years who exhibit signs of malnutrition (Gómez de León and Parker 2000). These benefits are contingent on participation by mothers in monthly health talks with the local health care provider, the vaccination of family members, health checks of all children under 5 years old, and biannual health checks of all household members. Overall, the program transfers are important, representing 8 percent of the average expenditures of beneficiary families (Bobonis 2009a).

The targeting of the program was done at two levels. First, eligible localities were identified on the basis of a locality-level eligibility rule. Program officials used locality-level characteristics from the Mexican 1995 Mini-Census of Population to construct a marginality index for each locality that reflected its degree of marginalization and was correlated with the community's incidence of poverty.[12] Second, program enumerators conducted household surveys within eligible localities to identify households that would be classified as poor. Based on asset holdings used as proxy variables for poverty, the program administrators generated a proxy-means test.[13] Therefore, within each eligible community, only households below a threshold became program beneficiaries. The list of potential beneficiaries was then discussed in a community meeting and suggested revisions sent to the central Oportunidades office. In practice, very few changes were made to the list of targeted households (Skoufias et al. 1999). This targeting and program eligibility information is important in the construction of our sample of eligible women (see Section IV.B).

[11] Receipt of the education-specific benefits is contingent on children attending school at least 85 percent of the time, which is verified by school personnel.

[12] The variables used to construct this marginality index were: (i) the locality's population, (ii) the number of dwellings in the village, (iii) the proportion of the adult population who was illiterate, (iv) the proportion of adults working in the agricultural sector (in 1990), the proportion of households (v) without potable water, (vi) without drainage, (vii) without electricity, (viii) with a dirt floor (in 1990), and (ix) the average number of persons per room in each household (in 1990).

[13] Within a sub-sample of communities, a poverty indicator was constructed using household income data collected from baseline surveys. A discriminant analysis was then separately applied in each region in order to identify the household characteristics that maximized the correct classification of as poor and non-poor (minimizing Type I and Type II targeting errors). Eligible households were identified on the basis of this welfare index (see Skoufias et al. 2001 for a more detailed description of the targeting process).

Initially, a locality was eligible for Oportunidades if it was classified as "poor" (marginality grade 4) or "very poor" (marginality grade 5) out of a 1-5 scale based on the locality-level marginality index, and if it had access to a primary school, a secondary school, a health center, and was classified rural (defined as inhabited by fewer than 2,500 people), but had at least 50 inhabitants (Skoufias et al. 1999). The last criterion was relaxed early on to incorporate some semi-urban localities (localities with between 2,500 and 14,999 inhabitants). The health center criterion was relaxed in 1998 when mobile health clinics were introduced. The inclusion of less marginal localities into the program was gradually extended throughout the 1997-2003 period. By the year 2003, localities within the marginality grade 3 (average marginality) had been incorporated into the program. The program was phased-in through a different targeting design in urban areas starting in 2001. Since this targeting mechanism is very complex and very different to the one implemented in rural and semi-urban areas, we focus our analysis on rural households.

B. Data, Measurement, and Summary Statistics

We use data from Mexico's National Survey on Relationships within the Household (ENDIREH) 2003 Survey, a nationally representative household survey measuring the prevalence and intensity of domestic violence, among other intra-household interactions. The survey, administered to 54,230 households during the months of October and November 2003, contains data on household demographics, socio-economic characteristics, marital histories, household decision-making, marital conflict, and a module designed to measure the prevalence and severity of spousal violence in the year preceding the survey. The module included questions on physical, sexual, emotional and economic abuse in the twelve months preceding the interview. It was administered to women 15 years or older living with a husband or partner; only one eligible woman per household was interviewed. In the following paragraphs, we provide a detailed description of the various measures of violence used in the analysis.[14] The exact survey questions are included in the Data Appendix.

Incidence of violence measures consist of dichotomous variables indicating whether the female partner had suffered physical, sexual, emotional, or economic abuse from her spouse or partner in the past 12 months. In the case of both physical and sexual violence, a single incident reported within the past year is classified as violence. The physical violence indicator is equal to one if the woman answered affirmatively to at least one question about

[14] This follows closely the description provided in the documentation and results of the survey in Castro et al (2006).

physical abuse, and the same is true for the sexual violence indicator. For each type of violence, questions range from least to most severe. For example, the first question on physical violence is as follows, "Has your partner pushed you or pulled your hair?", and the last, "Has your partner shot you with a gun?" For each question, women were asked first whether it had occurred in the past twelve months, and for those who answered affirmatively, how often it had occurred ("one time", "a few times", many times"). Physical violence includes pushing, kicking, throwing objects, hitting with hands or objects, choking, attacking with a knife or blade, and shooting. Sexual violence includes demanding sex, forced sexual acts, and forced sexual relations.

Emotional violence constitutes a complex set of behaviors (Strauss and Gelles 1990; Follingstad and DeHart 2000). Therefore, constructing an incidence measure of emotional violence measures is a challenging task. On one hand, we would like to use measures of emotional abuse as comprehensive as possible to encompass abusive behaviors usually not captured in household surveys. On the other hand, the construction involves making value judgments as to what constitutes violence of a psychological but non-physical form. Therefore, we constructed a measure of incidence of emotional abuse, and a measure of incidence of threats of violence, and assess how results may be sensitive to these definitions. For emotional abuse, survey questions are categorized as "low" or "high" severity. "Low" severity emotional abuse includes: a partner who stops speaking to a woman, humiliates her,[15] destroys or hides things that belong to her or the household, accuses her of cheating, locks her up and prohibits her from leaving the house or having visitors, has made her feel fear, or has turned her relatives against her. There are only two remaining questions, which are categorized as "high" severity emotional violence: a partner who has threatened a woman with a knife, blade, gun, or rifle, or a partner who has threatened to kill himself, her, or the children. For each of these (as well as the physical and sexual violence) questions, women were asked first whether it had occurred in the past twelve months, and for those who answered affirmatively, how often it had occurred ("one time", "a few times", many times"). Finally, our measure needs to take into account the possibility that it may involve perceptions of abuse, and may involve a substantial degree of bias – especially if the reporting to these questions is related to the woman's observed and unobserved determinants of spousal abuse.

The emotional violence indicator is equal to one if (i) a women answers "yes" to at least two of the "low" severity emotional abuse questions, or (ii) a woman answers "yes" to only one "low" severity emotional abuse question, but states it happened more than once ("a few times" or "many times") in the past year, or (iii) a woman

[15] Humiliation involves a positive answer to questions such as "Did he make you feel ashamed, belittled you, said you were ugly or compared you to other women?"

answers "yes" to one of the "high" severity emotional violence questions. To construct this measure, we restrict the questions to those which are least likely to involve the woman's perceptions: whether the partner destroys or hides things that belong to her or to the household, locks her up and prohibits her from leaving the house or from having visitors, and the threats of various forms. Finally, we construct the threat of violence indicator, which strictly includes the responses to the threat questions mentioned above.[16]

Data on program participation comes from the ENDIREH survey, and is self-reported by women. The measure we use is whether the woman receives benefits from any government support program. Although Oportunidades is the largest and most generous cash transfer program, there are other small government programs that provide non-cash benefits. As a result, this measure may over-report the receipt of Oportunidades benefits. Although there is some noise in the data (since only ten households per village are randomly selected to participate in the survey), the data aggregated by percentiles of the marginality index distribution are incredibly similar to the administrative data grouped in an analogous format. The correlation of the proportion of beneficiary households using the ENDIREH survey data with administrative data on the number of recipient households at the locality level in 2003 is 0.84 (not reported in the tables), which suggests that the information from the household survey closely represents receipt of Oportunidades benefits.

Finally, we employ a measure of the female partner's decision-making power within the household to assess whether the hypothesized effects are concentrated among the subset of couples for which partners tend to behave according to traditional gender roles – in cases that male partners have greater decision-making power in the household. We use an index measure created by Casique (2006) and reported in Castro, Riquer, and Medina (2006) that aggregates the female partner's decision-making power based on responses to thirteen questions regarding which partner(s) contribute to the household's decisions in areas such as: (i) the female spouse's labor force participation decision; (ii) the household's expenditure decisions; (iii) decisions regarding when to have sexual relations; (iv) the use of contraceptives; and (v) fertility decisions. The responses to these questions are coded in the following manner: decisions made solely by the male partner (= 0), jointly by both partners (= 1) or by the female partner (= 2). These are grouped based on a principal components analysis and aggregated into an index measure which lies in the [0.1] range using a weighted average; the weights are the proportion of the total variance explained

[16] We attempted to construct measures of the severity of violence. These indices were constructed based on the responses to the questions described above (and presented in detail in the data appendix). However, we believe that the quality of the severity and intensity data is quite limited, and chose not to use these in the main analysis.

by each of the components. This index measure is then categorized as female partners having low (measure ≤ 0.5) or high (measure > 0.5) decision-making power. See Casique (2006) for further details on the construction of this measure.

In order to minimize potential selection biases as a result of the endogenous take-up of the program, we restrict the analysis to a particular subset of households. Schultz (2004) and Behrman, Sengupta, and Todd (2005) report that school enrollment rates were close to one hundred percent for primary school children among both program and comparison village children in a randomized evaluation of the program, and, thus, that the program had no impacts on primary school enrollment. Based on this evidence, we assume that conditionality constraints are not likely to be binding for households with primary school children, and assume that the take-up of the program should essentially be complete for households with only primary school-aged (or younger) children.[17] Thus, we restrict the sample to intact households with children ages 11 years and younger at baseline; children who are not old enough to attend secondary school. As will be discussed in Section V, this sample restriction helps us to construct comparable groups of beneficiary and non-beneficiary households to perform the empirical analysis.

We also restrict the sample to women ages 25 and older, based on the reasoning that these women, if at some point during their lifetimes lived in program villages/localities, would have been too old to be eligible for program benefits as children, which could have potentially improved their socio-economic status before marriage (women in this sample were 19 years old and older during 1997, at the start of the initial phase-in of the program). This restriction minimizes potential confounding due to marital sorting based on the tolerance for spousal abuse and other potential determinants of the incidence of violence, such as the gains to marriage (Pollak 2004). These restrictions result in a 2,867 household sample.

The summary statistics based on the survey responses indicate that spousal violence is a pervasive phenomenon in rural Mexico. Forty (40) percent of women in the sample report having experienced some form of spousal violence within the last year, be it physical, sexual, emotional or economic (Table 1). The incidence rates of physical, sexual, and emotional violence are of similar magnitude in this population, with roughly 11 percent reporting having experienced some form of physical violence, 9 percent reporting some act of sexual violence, and 11 percent reporting evidence of emotional abuse in the previous year. These stark measures of abuse compare favorably to reported incidence of abuse in East African country contexts, but are high relative to the incidence rates

[17] Overall program take-up rates throughout this period are approximately 90 percent and are expected to be even higher for this subsample of households whose conditionality constraints are less likely to be binding (see Gertler, Martinez, and Rubio 2007).

reported in developed countries. Comparing violence incidence rates between beneficiary and non-beneficiary women, we find some evidence of significant reductions in physical violence and threats of abuse; these patterns preview the study's empirical findings.

Threats of violent behavior and physical abuse are also quite common in this context. Eight percent of women reported receiving threats by partners within the past year of either leaving the household (with or without their children), of being physically abused, or of being murdered – rates in line with those reported for the incidence of actual abuse (Table 1). As mentioned in Section III, these threats or acts of psychological violence and manipulation may be close to or as damaging to women's emotional health as acts of physical abuse. The incidence of threats of abuse or acts of emotional violence with no accompanying physical or sexual abuse is somewhat lower in the population; these range between 3.4-6.3 percent in this population. These various threat indicators will help us measure the extent to which the program induces a change in conflictive behavior among partners.

Women in this sample come from relatively poor socio-economic status households, since Oportunidades is targeted to poor households in marginalized rural communities (Table 2). Approximately 8 percent of women in the sample have no schooling, although two thirds of them (65 percent) have completed some primary school (Table 2, Panel A). A significant share of women (20 percent) are indigenous (based on the linguistic definition of indigenous background), which is highly correlated with low socio-economic status in Mexico. The women's average age is approximately 35 years, thus relatively young (as expected) since the sample selects women with children 11 years old and younger. The reported proportion of women exposed to spousal abuse between their parents during her childhood is quite large, at approximately 10 percent. Given the existing concerns and evidence regarding the intergenerational transmission of violent behavior, this statistic may provide a sign that women in this context may have a relatively high tolerance for spousal abuse, thus explaining the prevalence of abuse reported above.

Most male partners belong to the same age group (the average partner age is approximately 38 years), have similar schooling attainment, and are as likely to have an indigenous background (Table 2, Panel B). Interestingly, approximately 19 percent of partners live in a cohabiting union, a common observation in rural Mexico given the potentially high relative costs of marriage for poor individuals in rural areas. The reported proportion of male partners exposed to spousal abuse between their parents during their childhood is substantial, at approximately 18 percent. These, as will be shown below, are important predictors of spousal abuse among current partners. Finally,

note that households are relatively large, with 5.8 members on average, a statistic usually correlated with low socio-economic status in the Mexican context.

V. Empirical Methodology

Differences in spousal violence incidence rates between program beneficiaries and non-beneficiaries may in general reflect not only the effects of the Oportunidades program on violent behavior within the household, but also any differences in characteristics across groups that determine their selection into being program recipients and which independently affect spousal abuse patterns. Means comparisons of household baseline covariates document this potential selection: beneficiary women are more likely to be with an indigenous partner and be indigenous themselves; both they and their partners have significantly lower school attainment levels than non-beneficiaries; and finally, they report that their partners observed more spousal abuse during childhood, than non-beneficiary households (Table 2). Various potential reasons for this endogenous (self-) selection into the program may be: (i) the targeting mechanism, which tries to ensure that low socio-economic status households are the actual program beneficiaries (Skoufias, Davis, and de la Vega 2001); (ii) the possibility that program take-up decisions may be endogenous, based on the extent of women's decision-making power within the household; (iii) beneficiary couples may be more likely to dissolve (e.g., divorce) due to the potentially greater extent of conflict and the improvement in women's socio-economic conditions outside of current relationships – leading to a negatively selected sample of households in union; and finally, (iv) the program may lead to changes in marital matching and sorting patterns due to the expected changes in household resources and intra-household dynamics (especially for young individuals). As a result of these potential selection and endogeneity problems, simple means comparisons of spousal abuse outcomes among beneficiary and non-beneficiary households would violate the assumptions of unconditional independence necessary for identification of the program average treatment effect (ATE) (Rubin 1974).

To deal with these potential threats to validity, and in the absence of random assignment of the program to households in the sample, one can look for situations where treatment is based on observed variables and is otherwise exogenous. Under a conditional unconfoundedness assumption, treatment assignment is assumed independent of the potential outcomes conditional on a set of observed pre-treatment variables (Rubin 1978; Rosenbaum and Rubin 1983). In this paper, we use various strategies to minimize the extent of bias in program ATE estimates. First, as mentioned in Section IV, we use a sub-sample of households with children 11 years and younger,

households whose demographic compositions make them likely to fully take-up the program if eligible, thus minimizing concerns of endogenous program take-up. Second, we condition on a set of pre-determined individual and household socio-economic characteristics – shown in Table 2 – which are strongly correlated with determinants of program eligibility and likely to capture a large component of the variation determining household socio-economic program take-up. Finally, we restrict the sample to (i) women ages 25 and older and (ii) couples who have been in union since 1997 – who made their marital decisions preceding the start of the program – in order to minimize the likelihood that they benefited directly from program benefits (which started in some villages in 1997) as children, changing their socio-economic characteristics or possibly affecting their marital matching patterns. In the robustness tests section, we present estimates from empirical models that additionally condition or match on households' asset holding patterns, which should improve the common support of the beneficiary and non-beneficiary household samples, and address potential sample selection biases due to divorce.

Using this specific sub-sample, we first present ordinary least squares estimates of the ATE, conditioning on this set of pre-determined individual and household socio-economic characteristics, as well as village fixed effects, in order to capture any village-specific unobserved heterogeneity influencing spousal abuse patterns (e.g., access to health clinics, community groups). The regression equation for outcome Y_{iv} is the following:

$$Y_{iv} = \theta \cdot T_{iv} + X_{iv} \cdot \beta + \alpha_v + \varepsilon_{iv}, \tag{7}$$

where the treatment indicator T_{iv} equals one for beneficiary household i in village v and is zero otherwise; X_{iv} are the pre-determined covariates that are possibly significantly correlated with T_{iv} and Y_{iv}; α_v are village fixed effects, and ε_{iv} are unobserved determinants of domestic violence. We can alternatively estimate the ATE non-parametrically using a matching estimator weighted by the sampling probabilities (Abadie and Imbens 2006). This weighted matching estimator is:

$$\hat{\theta}_M = \frac{1}{N} \sum_i \rho_i \cdot \left(T_{iv} \hat{Y}_{1iv} + (1 - T_{iv}) \hat{Y}_{0iv} \right) \tag{8}$$

where $\hat{Y}_{0iv}$ equals Y_{0iv} if $T_{iv} = 0$, and equals a weighted average of the closest matches if $T_{iv} = 1$; and, likewise, $\hat{Y}_{1iv}$ equals Y_{1iv} if $T_{iv} = 1$, and equals a weighted average of the closest matches if $T_{iv} = 0$.

VI. Results

Average treatment effects of the program on the spousal violence and threats outcomes are displayed in Tables 3 and 4. We present OLS estimates in Column 1, and estimates from the non-parametric case-control matching estimator with and without regression-based bias adjustment in Columns 3 and 5, respectively. The magnitudes of the estimated effects relative to the non-beneficiary household couples are reported in each even-numbered column. In general, the matching-estimator impacts are smaller than the OLS estimates, and, since these are more likely to reduce or eliminate potential biases, we consider these our preferred estimates.

A. Program Impacts on Spousal Violence

Domestic violence incidence rates are lower among beneficiary households than among non-beneficiary households, and these effects are concentrated in reductions in partner's use of physical abuse. The estimated reduction in the incidence of any type of violence varies among specifications, ranging between 2.3 and 4.5 percentage points (6-11 percent), but in many cases not statistically different from zero (Table 3, row 1). There are nonetheless large and statistically significant reductions of 3.1-6.0 percentage points (29-55 percent) in the incidence of physical abuse (row 2). Our preferred matching estimate (with bias adjustment) shows an impact of 3.6 percentage points, or 33 percent (significant at 95 percent confidence). The impacts on physical violence are strengthened when we relax the definition of physical violence to include incidences of threats of physical violence, with matching estimates in the 3.7-4.1 percentage point (31-34 percent) range (significant at 95 percent confidence), and a less-precisely estimated OLS estimate (row 3). Moreover, the OLS point estimate of program impacts on sexual violence suggests reductions in the latter of approximately 6.6 percentage points, or 73 percent (significant at 95 percent confidence), although this result is not robust to the non-parametric matching estimation (row 4).

On the other hand, we do not find any consistent evidence of program impacts on the incidence of emotional violence. The point estimates on emotional violence, (the measure that excludes the female partner's responses to perception questions), suggest moderate increases in incidence of 2.2-4.1 percentage points (20-36 percent), although these estimates are all insignificantly different from zero (row 6).

The results indicate substantial reductions in physical abuse – but not in other forms of male-to-female spousal abuse – among beneficiary households. Moreover, the latter estimates of emotional violence weakly suggest that the incidence of the pattern of verbal non-physical abuse in the household may be increasing. We thus need to

distinguish whether there is some degree of substitution in the male partners' use of physical and emotional abuse, as predicted by the theory. This is examined in more detail in the following subsection.

B. Program Impacts on Threats of Spousal Violence

The program led to substantial increases in the incidence of violent threats or acts of emotional violence with no associated acts of physical or sexual abuse, in some cases more than doubling the incidence of these acts (Table 4). Although reports of the (unconditional) incidence of threats of violent behavior did not increase among beneficiaries relative to non-beneficiaries (row 1), threats of violent behavior conditional on no physical abuse increased by approximately 1.6-3.0 percentage points (44-81 percent), depending on the specification (row 2). The results are robust to expanding the definition of physical abuse to include sexual violence, with estimates ranging from 0.9 to 2.5 percentage points (row 3). The similarity in the estimated impacts is expected, since the violent threat measure includes threats of sexual abuse. The measured increases in the incidence of threats are however generally imprecisely estimated, with only the non-bias adjusted matching estimates being marginally significant (at 10 percent significance levels). Moreover, the point estimates and significance levels are reduced in both cases when we adjust for bias in the case-control matching estimates (rows 2-3, column 3).

We also find evidence of a substantial increase in the incidence of emotional violence (which incorporates other actions that may affect female partners' psychosocial status in addition to threats of violence), conditioning on a lack of physical violence (row 4). The point estimates indicate increases of 3.6-5.0 percentage points (57-79 percent) (significant at conventional confidence levels). These results are also robust to conditioning on a lack of prevalence of physical or sexual abuse (row 5). The point estimates are in the 1.8-4.0 percentage points (34-78 percent) range and precisely estimated in most cases; an exception is the case-control matching estimate with bias adjustment (row 5, column 3).

In conclusion, the benchmark results presented in this and the previous sub-sections show evidence of a substantial reduction in physical abuse – but an increase in male partners' use of threats or of emotional abuse with no associated physical or sexual abuse – among beneficiary households as a result of the program. These are consistent with the model's predictions – an increase in women's socioeconomic opportunities generate a greater incentive for male partners' to use emotional violence or threats of physical violence to extract rents from the wife's greater endowment and an associated reduction in the incidence of actual physical or sexual abuse.

C. Heterogeneous Program Impacts based on the Female Partner's Decision-Making Power

The model also predicts that the effects should be concentrated among the subset of couples in which partners tend to behave according to traditional gender roles – in cases that male partners have greater decision-making power in the household, for instance. To test this hypothesis, we estimate subgroup average program impacts for the main variables of interest for the couples in which female partners are categorized as having low or high decision-making power, respectively. The results are reported in Table 5.

Physical violence incidence rates are lower among beneficiary households than among non-beneficiary households, and these effects are somewhat concentrated in reductions among females with low decision-making power within the household (Table 5, Panel A, row 1). The estimated reduction in the incidence of physical violence for this subgroup varies among specifications, ranging between 12.9 percentage points (138 percent; significant at 99 percent confidence) in the OLS specification, and 3.5-3.9 percentage points (38-42 percent; significant at 85 or 90 percent confidence) in the matching models specifications (Table 5, row 1, columns 1-3). In contrast, the estimated reductions in physical violence for the subgroup of female partners with high decision-making power lie in the 1.0-4.0 percentage point (9-34 percent) range and are generally imprecisely estimated (row 1, columns 5-7).

We also find evidence that the program impacts on emotional violence are substantially greater among the sample of couples with low female partner decision-making power (Panel B). Among women with low decision-making power, the OLS point estimate indicates that the incidence of emotional violence increases by 5.4 percentage points (49 percent; not significantly different from zero) as a result of the program, and the matching estimates indicate an increase in the 5.1-7.7 percentage points (47-70 percent) range (significant at least at 90 percent confidence) (Panel B, row 1, columns 1-3). Again, the estimated effects among women with high decision-making power are smaller, lying in the 0.7-3.4 percentage point (6-30 percent) range and are statistically indistinguishable from zero at conventional confidence levels (Panel B, row 1, columns 5-7).

The estimates also show evidence of a substantial and statistically significant increase in the incidence of emotional violence conditioning on a lack of physical (or physical and sexual) violence concentrated among women with low decision-making power (Panel B, rows 2-3). Our preferred matching estimate (with bias adjustment) shows an impact of 9.7 percentage points (significant at 99 percent confidence) among the former group and an impact of 2.3 percentage points among the latter group. The empirical evidence thus confirms this substitution between

physical and non-physical forms of spousal abuse, and in particular among the sub-sample of households where women report having low decision-making power.

C. Robustness Tests

Interpreting the variation in the assignment of beneficiaries and non-beneficiaries within villages as exogenous relies on certain assumptions, and violations of these could lead to mistaken conclusions regarding the tests presented above. We need to assume that the individual and household-level unobserved determinants of threats of and actual violence are uncorrelated with the assignment to being a program beneficiary, conditioning on those observed and common village factors. In this section, we discuss potential biases and present a series of tests to assess the robustness of our estimates to more robust identifying assumptions.

Unobserved Differences in Socio-Economic Status

Although we ultimately cannot rule out some degree of selection and omitted variable biases in our estimates, we take comfort in the fact that the theoretical predictions and our previous set of results suggest a clear symmetry between the incidence of physical and sexual abuse on one hand and the incidence of emotional abuse and threats of violence on the other – a symmetry that is difficult to reconcile with monotonic selection bias arguments. For instance, the joint-cost hypothesis in non-cooperative bargaining models, which predicts that increasing the size of the surplus increases the opportunity cost for the aggressor to use violence, thus reducing its incidence (e.g., Kennan 1980), could lead to a downward bias (in absolute terms) on the estimated program impacts on physical abuse, but an upward bias on the emotional abuse effects. This would be the case, for instance, if beneficiary households had lower levels of asset-holdings, income, and/or gains to marriage than non-beneficiary households. Many other unobserved heterogeneity arguments would also not predict biases to go in opposite directions in the physical and emotional abuse empirical models.

We also report estimates from empirical models which additionally condition or match across beneficiary and non-beneficiary households using observable contemporaneous asset-holdings and dwelling characteristics (Table 6). These measures – indicators for whether the household has a dirt floor, potable water, access to potable water in the village, electricity, telephone, radio, drainage, kitchen, as well as the number of rooms and the number of bedrooms in the dwelling – should capture the socio-economic gradient across households in these poor villages.

We have somewhat less confidence in these estimates to the extent that these characteristics may be endogenous to the receipt of the program, as the program transfers may affect households' asset accumulation capabilities (Gertler, Martinez, and Rubio-Codina 2007).

The resulting OLS and matching estimates suggest that the direction of bias is as discussed above – the estimated effects on the incidence of physical violence are larger in absolute value (reductions of 4.3-6.1 percentage points, or 40-56 percent) and statistically significant (Table 6, Panel A, row 2). The estimated impact from our preferred matching estimate with bias adjustment is 5.8 percentage points, or 54 percent (significant at 99 percent confidence). Again, the impacts on physical violence are strengthened when we relax the definition of physical violence to include incidences of threats of physical violence, with estimates in the 5.6-6.6 percentage point (47-55 percent) range (significant at least at 90 percent confidence) (row 3). The analogous conditional threat of and emotional violence effects estimates are smaller in magnitude, as expected. The (preferred) matching estimates with bias adjustment of the emotional violence effects are marginally significant (at 10 percent significance levels) and large in proportional terms (2.5-2.6 percentage points, or 40-51 percent) (Panel B, rows 3-4, column 3).[18]

Selection based on Marital Dissolution

The program impact estimates could also suffer from bias if Oportunidades caused higher marital dissolution rates, and beneficiary couples who remained in a marital union had differing unobserved determinants of spousal abuse than non-beneficiary couples. As a result of this attrition bias, being a beneficiary could potentially be correlated with unobservable characteristics of couples who chose to remain in a relationship. To the extent that unions in which women would be more likely to suffer from abuse are the most [least] likely to dissolve as a result of the program, it would lead to an upward [downward] bias (in absolute terms) in the estimates of physical abuse and a downward [upward] bias in the emotional abuse effects. Unfortunately, we do not have the necessary longitudinal or recall data among these women to estimate these divorce-driven attrition rates for this sample. However, Bobonis (2009a,b) shows – using the randomized evaluation of the program during the 1998-99 period – that divorce rates in this context were minimal - 0.75 percent of couples had dissolved after two years – and nearly identical across groups – 0.76 percentage points higher in the treatment relative to the control group. This would suggest that we can confidently set aside a potential selection problem due to marital dissolution.

[18] The subgroup estimates by the female partner's decision-making power levels are robust to the inclusion of the asset-holdings and dwelling characteristics. Estimates are available from the authors upon request.

We further take this potential source of bias into consideration by estimating Horowitz and Manski (2000) non-parametric treatment effect bounds, using Bobonis (2009a,b)'s experimental estimates of the divorce-driven attrition rates. This method sums up to (i) identifying the missing number of couples who are induced to leave the sample because of the treatment, and (ii) imputing the missing data with either the largest or smallest possible values, which yields a set of best and worst-case scenario bounds. Given the relatively similar attrition patterns across groups, this method yields reasonably tight bounds.[19] The treatment effect bounds on the incidence of physical abuse are reductions of 0.6 percentage points (6 percent) and 4.9 percentage points (46 percent), whereas those for physical violence or threats of abuse are 1.3 percentage points (11 percent) and 5.6 percentage points (47 percent) (Table 7, Panel A, columns 2-3). The analogous treatment effect lower bounds for the conditional incidence of threats of abuse or emotional violence are of the same (positive) sign as the point estimate and reasonably large, in the 17-38 percent range (Panel B). In sum, this bound analysis suggests that divorce-driven sample attrition does not lead to a significant bias of our estimates of program impacts.

Stress and Conflict in the Household

The program increases the level of household resources, not just the socioeconomic opportunities available to (or more specifically, the income of) adult women. If this increase in household resources reduced stress levels among partners and/or improved the emotional health of adults (or children) in the family, it could lead to a reduction in the incidence or severity of spousal abuse. Although we do not have measures of the emotional well-being or of the mental health of adult household members, we can assess whether there is some reduction in other measures of intra-household conflict, by examining whether there is a reduction in the level of violence against children perpetrated by each parent. We estimate models analogous to those discussed in Section VI.C. The measures of incidence of violence against children consist of two dichotomous variables indicating whether the female partner beat the child as a result of him or her behaving badly, and whether the male partner does so.[20]

The resulting OLS and matching estimates suggest no impact of the program on the use of violence against children: the estimated incidence effects are small and of the unexpected sign – increases of 2.9-4.3 percentage points (6-9 percent; insignificantly different from zero) in the proportion of female partners who use physical

[19] Lee (2008) treatment effect bounds for the sub-sample of couples who would not have divorced in the absence of the program are even tighter; these are available from the authors upon request.
[20] The exact questions are: "Do you (does your husband/partner) beat your children when they behave badly? (Yes, No)."

violence against their children (Table 8, row 1). The incidence of parental violence against children is also unmoved as a result of the program: the estimated effects suggest a minuscule increase in the use of violence in the 0.1-2.2 percentage points range (0-10 percent; statistically indistinguishable from zero; row 2). This suggestive evidence goes against the alternative hypothesis that aggression decreases as a result of a reduction in tension or stress levels or an improvement in the emotional health of partners. More generally, the series of robustness checks help us mitigate the concerns for bias in our estimates of the program impacts.

VII. Conclusion

The main objective of this paper is to provide evidence of the effect of the Oportunidades conditional cash transfer program on the prevalence of male-to-female spousal violence in rural Mexico. The evidence suggests that women in beneficiary households are 33 percent less likely to be victims of physical abuse than non-beneficiary women, impacts that may come as a consequence of an increase in women's empowerment within the household. However, women in beneficiary households are as likely as non-beneficiary women to receive threats of violent behavior and be victims of emotional abuse, and substantially more likely to receive threats of abuse with no associated physical abuse, than women in non-beneficiary households.

As a second contribution, we present a theoretical framework adapting Bloch and Rao (2002)'s signaling theory of domestic violence in household bargaining to model how male partners may use threats of violence as instruments to appropriate resources from (i.e., extract rents) or control the behaviors of their female counterparts. Essentially, we provide a different interpretation to their model of terror as a bargaining instrument across families. In this set-up, male partners have private information regarding the gains to marriage. Because of this private information, they can use threats of abuse to coercively demand transfers from their wives, and strategically use violence based on wives' decision to abide to the act of coercion. The model predicts that, if marginal increases in women's income lead to an increase in the amount of rents that husbands are willing to extract, this will lead to an increase in the threat of use of spousal abuse with no subsequent physical abuse, and a reduction in the actual use of spousal abuse. The prediction from this asymmetric information model, shown to be consistent with the empirical findings, enrich the existing work studying the relationship between women's income and economic opportunities, the extent of spousal abuse, and the degree of female empowerment.

The article may have important implications for policy, since it provide a mixed view of conditional cash transfer programs' effectiveness in improving women's empowerment within the household. The program may increase the likelihood of violent threats, which may in turn compromise women's emotional health and other aspects of their wellbeing. Moreover, the study contributes to the empirical work opening the black box of intra-household decision-making. For instance, as presented in our bargaining framework, information asymmetries may lead to multiple equilibria: non-violent households achieve Pareto optimal allocation decisions whereas violent ones suffer from the destruction of a share of the gains to marriage. This may inform other empirical work examining the Pareto efficiency of intra-household allocations, as pioneered by Udry (1996) and Browning et al. (1994).

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Table 1: Description of outcome variables: Male-to-female spousal abuse and threats of violence

Variable Name	Description	Sample Mean [Std Dev]		
		All	Ben	Non-Ben
Any violence	Indicator for any occurance of physical, sexual, emotional, or economic abuse	0.40	0.37	0.42
Physical violence	Indicator for any occurance of physical abuse (e.g., push, beating, attack with blade)	0.11	0.09	0.13
Physical abuse & threat of violence	Indicator for any occurance of physical abuse or threat of physical abuse	0.12	0.10	0.14+
Sexual violence	Indicator for any occurance of sexual abuse (e.g., use of force to have sexual relations)	0.09	0.08	0.10
Emotional violence	Indicator for any occurance of psychological abuse, excluding perceptions questions (e.g., locked you in, threatened to leave you)	0.11	0.10	0.12
Threat of physical violence	Indicator for any occurance of physical abuse threat (e.g., threat of leaving, threat w/ deadly weapon, threat to kill)	0.08	0.07	0.09

Notes: Sample means weighted by inverse sampling weights. Significant differences between beneficiary and non-beneficiary households at (*) 10 percent; (+) 15 percent levels, respectively. N = 2,867; sample includes women ages 25 and older in rural villages with children ages 11 and younger.

Table 2: Comparison of means, Beneficiary and non-beneficiary households

Pre-treatment Covariate	Unconditional means			Difference in Means
	All	Beneficiary	Non-Beneficiary	Ben. - Non-Ben.
	(1)	(2)	(3)	(4)
Panel A: Female Partner Characteristics				
Woman's age	34.9	35.0	34.8	0.27
Indigenous woman	0.14	0.20	0.08	0.13 ***
No schooling	0.08	0.12	0.05	0.07 ***
Primary school	0.65	0.71	0.60	0.11 ***
Middle school	0.18	0.14	0.22	-0.08 ***
Secondary school	0.04	0.02	0.06	-0.04 ***
Spousal violence in woman's childhood	0.10	0.10	0.10	0.00
Panel B: Partner and Household Characteristics				
Partner's age	37.7	38.4	37.1	1.24 *
Indigenous partner	0.14	0.20	0.09	0.11 ***
Partner's schooling	5.7	5.0	6.4	-1.35 ***
Spousal violence in partner's childhood	0.18	0.15	0.21	-0.06 *
Cohabiting couple	0.19	0.19	0.20	-0.01
Family size	5.8	6.3	5.4	0.94 ***
Years in union	15.2	16.0	14.3	1.67 **

Notes: Sample means weighted by inverse sampling weights. Significant differences between beneficiary and non-beneficiary households at (*) 10 percent, (**) 5 percent, and (***) 1 percent significance levels, respectively. Sample size is 2,867; sample includes women ages 25 and older in rural villages with children ages 11 and younger.

Table 3: Estimates of the average treatment effect of Oportunidades on spousal violence

Dependent Variables	Coefficient Estimate on Beneficiary Status (s.e.)						Mean of dep. variable
	OLS estimate		Matching estimate		Matching estimate		
	ATE	%Δ	ATE	%Δ	ATE	%Δ	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Any violence	-0.029	-7%	-0.045^{+}	-11%	-0.023	-6%	0.395
	(0.053)		(0.031)		(0.031)		
Physical violence	-0.060*	-55%	-0.036**	-33%	-0.031*	-29%	0.108
	(0.035)		(0.017)		(0.017)		
Physical violence or threat	-0.057^{+}	-48%	-0.041**	-34%	-0.037**	-31%	0.120
	(0.035)		(0.018)		(0.018)		
Sexual violence	-0.066**	-73%	-0.022	-24%	-0.020	-22%	0.090
	(0.029)		(0.016)		(0.016)		
Emotional violence	0.041	36%	0.026	23%	0.022	20%	0.113
	(0.036)		(0.018)		(0.018)		
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2867		2867		2867		

Notes: Each reported coefficient is from a different estimator. Robust standard errors in parentheses; significant at (+) 85 percent, (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. Coefficient estimates from village fixed effects OLS regressions and non-parametric matching estimators weighted by survey sampling weights. Controls for OLS regression and matching estimators include indicator variables for woman and partner's age, indigenous status, household size, women's schooling-level indicators, cohabiting couple indicator, variables measuring reported histories of spousal abuse in parental household during childhood.

Table 4: Estimates of the average treatment effect of Oportunidades on threats of violence

Dependent Variables	Coefficient Estimate on Beneficiary Status (s.e.)						Mean of dep. variable
	OLS estimate		Matching estimate		Matching estimate		
	ATE	%Δ	ATE	%Δ	ATE	%Δ	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Threat of violence	0.004	6%	0.010	12%	0.004	5%	0.079
	(0.036)		(0.021)		(0.021)		
Threat | no physical violence	0.024	64%	0.016	44%	0.030*	81%	0.037
	(0.020)		(0.016)		(0.016)		
Threat | no physical or sexual violence	0.021	62%	0.009	26%	0.025*	74%	0.034
	(0.019)		(0.014)		(0.014)		
Emotional violence | no physical violence	0.040*	63%	0.036***	57%	0.050***	79%	0.063
	(0.022)		(0.013)		(0.013)		
Emotional violence | no physical or sexual violence	0.034+	67%	0.018	34%	0.040***	78%	0.051
	(0.023)		(0.015)		(0.015)		
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2611 / 2479		2611 / 2479		2611 / 2479		

Notes: Each reported coefficient is from a different estimator. Robust standard errors in parentheses; significant at (+) 85 percent, (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. Coefficient estimates from village fixed effects OLS regressions and non-parametric matching estimators weighted by survey sampling weights. Controls for OLS regression and matching estimators include indicator variables for woman and partner's age, indigenous status, household size, women's schooling-level indicators, cohabiting couple indicator, variables measuring reported histories of spousal abuse in parental household during childhood. Sample sizes in specifications conditioning on no episode of physical violence or no episode of physical or sexual abuse are 2611 and 2479, respectively.

Table 5: Estimates of program impacts by category of female partners' decision-making power

Dependent Variables	**Sub-Group ATE Estimates (s.e.)**							
	Female Partners with Low Decision-Making Power				**Female Partners with High Decision-Making Power**			
	OLS	**Matching Estimates**		**Mean of dep. var.**	**OLS**	**Matching Estimates**		**Mean of dep. var.**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Violent actions								
Physical violence	-0.129***	-0.035^{+}	-0.039*	0.093	-0.028	-0.040^{+}	-0.010	0.116
	(0.050)	(0.024)	(0.024)		(0.037)	(0.025)	(0.025)	
	-138%	-38%	-42%		-24%	-34%	-9%	
Panel B: Threats of violence								
Emotional violence	0.054	0.077***	0.051*	0.109	0.034	0.027	0.007	0.115
	(0.064)	(0.028)	(0.028)		(0.041)	(0.031)	(0.031)	
	49%	70%	47%		30%	23%	6%	
Emotional violence | no physical violence	0.095*	0.097***	0.059***	0.058	0.030	0.023	-0.001	0.066
	(0.052)	(0.022)	(0.022)		(0.039)	(0.024)	(0.024)	
	165%	168%	102%		45%	36%	-2%	
Emotional violence | no physical or sexual viol.	0.074	0.042**	0.035*	0.052	0.043	0.022	0.000	0.050
	(0.054)	(0.020)	(0.020)		(0.032)	(0.022)	(0.022)	
	141%	79%	67%		86%	44%	-1%	
Village Fixed Effects (or Matching within Village)	Yes	Yes	Yes		Yes	Yes	Yes	
Bias Adjustment	-	Yes	No		-	Yes	No	
Observations	1110 / 1003 / 939				1757 / 1608 / 1540			

Notes: Each reported coefficient is from a different estimator. Robust standard errors in parentheses; significant at (+) 85 percent, (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. See notes to Tables 3 and 4 for details on the .specifications and the set of controls Sample sizes in specifications conditioning on no episode of physical [physical or sexual] violence are 1003 and 939 [1608 and 1540] for the subgroup of couples where women are classified as having low [high] decision-making power.

Table 6: Robustness Checks of Program Impacts, Asset Characteristics Controls

Dependent Variables	Coefficient Estimate on Beneficiary Status (s.e.)						Mean of dep. variable
	OLS estimate		Matching estimate		Matching estimate		
	ATE	%Δ	ATE	%Δ	ATE	%Δ	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Violent actions							
Any violence	-0.028	-7%	-0.084***	-21%	-0.043	-11%	0.395
	(0.052)		(0.032)		(0.032)		
Physical violence	-0.061*	-56%	-0.058***	-54%	-0.043**	-40%	0.108
	(0.035)		(0.020)		(0.020)		
Physical violence or threat	-0.059*	-49%	-0.066***	-55%	-0.056***	-47%	0.120
	(0.059)		(0.020)		(0.020)		
Sexual violence	-0.061**	-68%	-0.017	-19%	-0.022^{+}	-24%	0.090
	(0.029)		(0.014)		(0.014)		
Emotional violence	0.031	27%	-0.010	-9%	-0.010	-9%	0.113
	(0.033)		(0.021)		(0.020)		
Panel B: Threats of violence							
Threat | no physical violence	0.023	61%	0.019^{+}	52%	0.004	12%	0.037
	(0.017)		(0.013)		(0.013)		
Threat | no physical or sexual violence	0.019	57%	0.014	41%	0.003	9%	0.034
	(0.017)		(0.013)		(0.013)		
Emotional violence | no physical violence	0.044^{+}	70%	0.025*	40%	0.005	8%	0.063
	(0.031)		(0.014)		(0.014)		
Emotional violence | no physical or sexual violence	0.050*	98%	0.026*	51%	0.012	23%	0.051
	(0.027)		(0.014)		(0.014)		
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Additional asset controls	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2867		2867		2867		

Notes: Robust standard errors in parentheses; significant at (+) 85 percent, (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. See notes to Tables 3 and 4 for further details. Additional asset controls are a dirt floor dwelling indicator, access to telephone and electricity indicators, radio ownership, and number of bedrooms.

Table 7: Bounds on Average Treatment Effects for Selective Attrition due to Divorce

Dependent Variables	ATE Estimate (s.e.)						Mean of dep. variable
	Matching estimate		Upper Bound		Lower Bound		
	ATE	%Δ	BE	%Δ	BE	%Δ	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Violent actions							
Any violence	-0.045+ (0.031)	-11%	-0.064	-16%	-0.021	-5%	0.395
Physical violence	-0.036** (0.017)	-33%	-0.049	-46%	-0.006	-6%	0.108
Physical violence or threat	-0.041** (0.018)	-34%	-0.056	-47%	-0.013	-11%	0.120
Sexual violence	-0.022 (0.016)	-24%	-0.037	-41%	0.006	7%	0.090
Emotional violence	0.026 (0.018)	23%	0.052	46%	0.009	8%	0.113
Panel B: Threats of violence							
Threat | no physical violence	0.024 (0.020)	64%	0.051	138%	0.008	22%	0.037
Threat | no physical or sexual violence	0.021 (0.019)	62%	0.049	145%	0.006	17%	0.034
Emotional violence | no physical violence	0.040* (0.022)	63%	0.067	106%	0.024	38%	0.063
Emotional violence | no physical or sexual violence	0.034+ (0.023)	67%	0.061	120%	0.018	35%	0.051
Matching within Village	Yes		-		-		
Bias Adjustment	Yes		-		-		
Observations	2867		2867		2867		

Notes: Each reported coefficient is from a different nonparametric matching estimation. See notes to Tables 3-5 for robustness of standard errors, significance levels, and variables used in matching algorithm. Bounds represent estimated effects assuming that the 1.44 percent of unions expected to dissolve have probability of committing the violent act with probability p equal to one or zero.

Table 8: Other Robustness Checks – Violence against Children

Dependent Variables	**ATE Estimate (s.e.)**						**Mean of dep. variable**
	OLS estimate		**Matching estimate**		**Matching estimate**		
	ATE	**%Δ**	**ATE**	**%Δ**	**ATE**	**%Δ**	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female partner hits children	0.032 (0.055)	6%	0.029 (0.035)	6%	0.043 (0.035)	9%	0.506
Male partner hits children	0.001 (0.038)	0%	0.022 (0.026)	10%	0.011 (0.026)	5%	0.217
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Additional asset controls	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2867		2867		2867		

Notes: Robust standard errors in parentheses; significant at (+) 85 percent, (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. See notes to Tables 3 and 4 for further details. Additional asset controls are a dirt floor dwelling indicator, access to telephone and electricity indicators, radio ownership, and number of bedrooms.

Data Appendix: Questions in the Domestic Violence Module

For each question, women were first asked whether the behavior had occurred within the past twelve months. If the answer was "yes", there was a follow-up question that asked how often it had occurred. The responses available were "One time", "A few times", and "Many times".

A. Physical Violence
   In the past twelve months, has your spouse/partner…
   1. Pushed you or pulled your hair?
   2. Tied you up?
   3. Kicked you?
   4. Thrown any object at you?
   5. Hit you with his hands or with an object?
   6. Tried to choke or strangle you?
   7. Attacked you with a knife or blade?
   8. Shot you with a firearm?

B. Sexual Violence
   In the past twelve months, has your spouse/partner…
   1. Demanded that you have sex with him?
   2. Forced you to do [sexual] things?
   3. Used force to have sexual relations?

C. Emotional Violence
   In the past twelve months, has your spouse/partner…
   1. Stopped speaking to you?
   2. Made you feel ashamed, belittled you, said you were ugly or compared you to other women?
   3. Destroyed, thrown away, or hidden things that belong to you or to your household?
   4. Threatened to leave you, hurt you, take your children away or kick you out?
   5. Become very angry because the domestic chores are not done, because the food is not done the way he likes it, or he thinks you did not fulfill your duties?
   6. Locked you in, forbidden you from going out or being visited?
   7. Left you with all the domestic work and childcare even when he had time to help?
   8. Accused you of cheating on him?
   9. Made you feel fear?
   10. Turned your relatives against you?
   11. Ignores you, does not take you into account, does not give you affection?
   12. Threatened you with a deadly weapon (knife, switchblade, gun or rifle)?
   13. Threatened to kill you, kill himself, or kill the children?