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Public Transfers and Spousal Violence

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Abstract: Economic models of the family suggest that transfer programs in which funds are targeted to women may increase the incidence of spousal abuse between partners. This study uses data from a survey in Mexico to examine the impact of the Oportunidades conditional cash transfer program on spousal abuse rates and the threat of violence. We find mixed evidence regarding program impacts: although women in beneficiary households are 30 percent less likely to be victims of physical and sexual abuse than women in non-beneficiary households, they are substantially more likely to receive violent threats with no subsequent physical abuse. We present a model of asymmetric information in household bargaining to document how increases in women's income can lead to an increase in the amount of rents that husbands are willing to extract, and in turn lead to a rise in their use of violent threats with no subsequent physical abuse and a reduction in the actual use of spousal abuse – predictions consistent with the empirical evidence.

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I. Introduction

Violence and the threat of violent actions are often used as mechanisms to redistribute resources in society. In particular, spousal abuse has been proposed as a prominent example of economically motivated violent behavior. In marriage, the quintessential example of an incomplete contract, threats or actual acts of violence may be instruments at the disposition of individuals to bargain for the control of resources or partner's behavior in particular ways (Tauchen, Witte, and Long, 1991; Bloch and Rao, 2002; Jacoby and Mansuri, 2006).

Moreover, marital violence is particularly prevalent across societies, and – as other forms of violent behavior – it may be a very costly instrument of redistribution, making it an important public policy issue. In the U.S., for instance, estimates of the prevalence of physical abuse during the 1980s suggest rates of "severe" husband-to-wife violence of 30 per thousand per year (Blau, 1998).[4] In our context of study, rural Mexico, seven percent of currently married women reported being victims of physical abuse from their male partners during the past year (INEGI, 2004). In Canada, evidence from the early 1990s indicates that 29 percent of ever-married women and 50 percent of divorced women have been the victims of spousal abuse. Recent attempts to measure the overall social cost of domestic violence in Canada place it at around $4 billion, or 0.4 percent of GDP (Greaves, Hankivsky, and Kingston-Riechers, 1995).[5]

An important policy question is: are there public policy mechanisms – for LDCs in particular – which could be used to reduce the incidence of spousal abuse? A growing number of less developed countries have introduced conditional cash transfer programs in which funds are specifically targeted to women. This gender-based targeting of public transfers may have major consequences for women's welfare, since it is believed that resources in the hands of women disproportionately improve their welfare (e.g., Thomas, 1990; Duflo, 2003). However, although one of these programs' objectives is the empowerment of women, increased prevalence of domestic violence may be an unintended consequence, since unexpected changes in women's income may increase the incentives of male partners to use violence or threats of violence to extract rents from their wives.

The objective of this paper is twofold. First, we provide evidence of the effect of the Oportunidades conditional cash transfer program – a human development program initiated by the

[4] Blau (1998) provides these estimates of "severe" physical violence.

[5] As mentioned by Greaves, Hankivsky, and Kingston-Riechers (1995), putting a dollar value on violence against women represents only one dimension of a very complex social problem; many aspects of violence against women, such as emotional suffering, deterioration of the quality of or loss of life cannot be or are not easily quantified.

Mexican government in 1997 that provides cash transfers for marginalized households in rural areas – on the prevalence of male-to-female spousal violence.[6] To accomplish this, we use data from a newly available nationally-representative survey, the National Survey on Relationships within the Household (ENDIREH 2003), which includes detailed information on the prevalence and intensity of male-to-female spousal abuse and threats of violence against women. We broadly 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 among rural Mexican households.

Constructing comparable groups of beneficiary and non-beneficiary households within each village (to minimize the extent of omitted variable and selection biases), we find that women in beneficiary households are 30 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, the distinction between the different types of violence is meaningful: women in beneficiary households are as likely as non-beneficiary women to receive threats of violent behavior and be victims of emotional abuse. Together, these results make a strong case for the formulation of a theoretical framework that may help explain the divergence in the response of husband's use of threats of violence and the actual acts of violence as a result of changes in women's income.

As a second contribution of the paper, we present a theoretical framework adapting Bloch and Rao (2002)'s asymmetric information model of domestic violence in household bargaining to understand how male partners may use threats of and actual violence as instruments to extract rents from their female counterpart's share of the marital surplus. In this set-up, male partners signal their dissatisfaction with marriage through the use of threats of violence and demand rent transfers from wives if they have an incentive to do so. Acts of violence are then a response to the 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, then this will lead to (i) an increase in the threat of use of spousal abuse with no subsequent physical abuse, and (ii) a reduction in the actual use of spousal abuse. Finally, we test these empirical predictions of the model using the variation in women's income driven by the public transfer program. Essentially, we find evidence consistent with the theoretical predictions: women in beneficiary households are

[6] The transfer is paid to mothers contingent on certain requirements in terms of children's school attendance and family-level visits to health services.

substantially more likely to receive threats of use of spousal abuse with no subsequent physical abuse than women in non-beneficiary households, and, as discussed above, less likely to be victims of physical and sexually abusive behavior.

The findings outlined in this 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 (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 provides a mixed view of their effectiveness in improving women's empowerment within the household, since the programs may increase the likelihood of violent threats, which may in turn compromise women's emotional health and other aspects of their wellbeing.

This study 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 efficiency of intra-household resource allocation decisions.[7] 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 efficiency. Rasul (2005) finds evidence consistent with limited commitment in partners' 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 (2006) 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 partners' private information can help them gain undue influence in the behavior and welfare of other household members.

[7] A substantial empirical literature assesses the extent of full 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 constrained 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), and Akresh (2005) find evidence inconsistent with Pareto efficiency among rural household in Africa. These results are contested by Rangel and Thomas (2005) using data for West African households and Bobonis (2006) among rural households in Mexico.

The paper is structured as follows. In Section II we briefly discuss the theoretical and empirical literature on spousal abuse in both developed and developing countries. Section III discusses the theoretical framework and the main predictions of the model. 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. Women's Income and Spousal Abuse

There is a growing theoretical literature on the causes of domestic violence in economics and a rich literature in other social sciences, particularly sociology and psychology. Spousal violence is associated with both a source of gratification for the partner (husband) (e.g., a direct enjoyment of the pain of another or release of frustration) and as an instrument for controlling the victim's resources or behavior (Tauchen et al. 1991; Bloch and Rao, 2002.). Existing models of spousal violence include non-cooperative bargaining models in which female income, and more generally, financial resources outside the marriage change the woman's threat point and, all else equal, may reduce the level of violence in equilibrium (Tauchen et al, 2001; Farmer and Thiefenthaler, 1997). More recently, Bloch and Rao (2002) model spousal violence in India as a bargaining instrument used to extract larger dowry payments from the bride's family. However, the bargaining and reallocation of resources takes place between the families of the bride and groom, rather than within the couple itself.

Other theoretical work 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.[8] 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. Finally, Pollak (2003) 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 increases the equilibrium level of violence.

At risk of oversimplifying, sociological models link violence to gender inequality. The causes of gender violence lie in the way society is organized: for instance, unequal economic opportunities

[8] See Bowlus and Seitz (2005) for an exception to this common belief in the Canadian context.

available to women and men, the availability of institutional resources for women who are victims of spousal violence, and the degree of protection offered by the legal system all affect the prevalence of violence against women.[9] Psychological models also incorporate individual characteristics as determinants of violence. The literature characterizes violence as an expression of the batterer's desire for control over the victim, and links violence to batterer's low self-esteem, pathological jealousy, and severe stress. There is also qualitative evidence that abuse is often accompanied by a curtailment of the victim's economic and social independence.[10]

Existing (non-experimental) empirical evidence on the relationship between female and income and violence is mixed. In the U.S., Tauchen et al. (1991) examine this relationship using a sample of 125 women referred from shelters and other advocates for battered women, and find the expected negative correlation between violence and female income for a subset of low and middle income couples in their sample. However, these results are based on a small non-random sample (of battered women), and therefore are not comparable to studies based on representative samples of women. 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. They find evidence consistent with unilateral divorce laws substantially reducing all of the above outcomes. In the context of less developed countries, 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. In the next section, we discuss a model of asymmetric information in household bargaining to document how increases in women's income can lead to a rise in partners' use of violent threats and reductions in the actual use of spousal abuse – predictions that may address the potential paradoxes presented in the paper and those existing in the empirical literature.

III. Husband's Private Information, Violent Threats and Spousal Abuse [11]

The following theoretical framework adapts Bloch and Rao (2002)'s signaling model of domestic violence to understand how male partners may use threats of and actual violent behavior as instruments to extract rents from their female counterpart's share of the marital surplus. This set-up

[9] For details on the sociological literature, see the review in Castro (2004).
[10] See Walker (1984).
[11] This section draws heavily on Bloch and Rao (2002). Essentially, we provide a different interpretation to their model of terror as a bargaining instrument across families.

will allow us to uncover the mechanisms through which increases in wives' income may result in greater threats of spousal abuse from their partners but in a lower incidence of actual acts of abuse.

We consider a static non-cooperative bargaining model with asymmetric information, where the threat of violence is interpreted as a signal sent by the husband to the wife about his level of satisfaction with the marriage. This asymmetry allows the husband to demand a resource transfer from his partner. Following the latter's decision whether to abide to the former's demands or not, the model specifies the conditions under which actual acts of physical violence will occur. Although concerns may be raised as to whether repeated (complete information) non-cooperative bargaining models could provide similar predictions regarding violent behavior, it is a priori possible that these are likely to sustain efficient outcomes, ruling out the exercise of threats and violence in equilibrium.

More specifically, our application of the Bloch and Rao (2002) model results in an equilibrium in which, after the husband's level of satisfaction has been revealed, (i) satisfied husbands would prefer to remain in the current union independently of receiving transfers from their partners and do not threaten with or use violence against their partners; (ii) unsatisfied husbands would prefer to use violence and reach a Pareto inefficient intra-household resource allocation unless they receive a transfer of the marital surplus from their wives; they use threats of violence to signal their dissatisfaction, and may obtain transfers from their partner. We discuss the set-up and main predictions of the model in the following paragraphs.

We will analyze the distribution of resources in a two breadwinner household where h and w respectively denote the two agents: husband and wife. The marriage forms 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 husband's and wife's incomes, x_h, x_w, denote vectors of human-capital characteristics of each partner, and θ is the husband's private level of satisfaction with the marriage. Assume that the indirect utility functions are strictly increasing in all their arguments and strictly concave in income.

We assume that the negotiation game has the following structure:

Structure of the game:

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

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

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

Stage 4: The husband chooses whether to use physical violence or not and, if so, the partnership's equilibrium allocation choice is Pareto inefficient (e.g., "separate spheres" equilibrium).

We will now 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, $\boldsymbol{z}$, 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 satisfied husbands and 0 for dissatisfied ones. The prior probability that the husband is dissatisfied, $\Pr(\theta = 0)$, is a function of the observable characteristics of the marriage, $p(z)$, with $p'(\boldsymbol{z}) < 0$.

In the following stage, the husband chooses whether to threaten the wife with physically abusing her. Both partners suffer 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 prejudicial to both men's and women's mental health and 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 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 (Jacoby and Mansuri 2006; Bobonis 2006). Following the possible threat and demand, the wife responds by accepting or rejecting the offer. In the current version of the model, we assume that divorce is too costly for the wife and she will prefer to pay a transfer than divorce, but will in the future endogenize the wife's divorce option at this point.

In the final stage of the game, the husband chooses to actually use physical violence to punish his wife's potential deviant behavior, which entails the destruction of a share of the marital surplus, and the household reaches a non-cooperative "separate spheres" equilibrium that in may additionally reduce the marital surplus. If this were the case, the partners enjoy more limited joint

production possibilities of 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 strictly increasing in its arguments and strictly concave in income.

The following assumptions - analogous to Bloch and Rao (2002)'s – ensure a uniquely determined separating perfect Bayesian equilibrium of the game (which satisfies the Cho-Kreps intuitive criterion), where, as mentioned above, satisfied husbands do not make violent threats or use violence, whereas unsatisfied husbands have incentives to use violent threats to extract a transfer from their partners.

Assumption 1: For any level of income (I_h) and socio-economic characteristics of the partners (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: Husband's cost of making violent threats. $C_h(1) = \infty$; $C_h(0) = \eta$ is a random variable with cumulative distribution function F_η on $[0, \infty)$.

Assumption 3: A wife will strictly prefer to suffer violent threats and provide transfers than to reject the partner's demand, suffer physical abuse, and reach a Pareto-inefficient intra-household resource allocation ourcome: $u_w(Y_w - t, x_h, x_w) - C_w \geq v_w(Y_w, x_w)$.[12]

We briefly discuss the conditions which characterize the equilibrium, and which elucidate how increases in women's income may affect their partner's violent behavior. First, the wife's decision to accept or reject the demand will depend on the expected cost – based on her posterior beliefs regarding the probability that the husband is dissatisfied, μ (given the threat of violence) – of paying a transfer to a husband who is satisfied, relative to the prospects of suffering physical abuse she faces from a dissatisfied husband if she rejects the demand. Formally, the wife will accept to pay any transfer payment demand such that:

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

The maximal amount that the wife is willing to pay to her husband, $t^w(\mu)$, is the solution to the following condition:

$$\mu\, v_w(Y_w, x_w) + (1-\mu)\, u_w(Y_w, x_h, x_w) = u_w(Y_w - t^w(\mu), x_h, x_w) \quad (2)$$

[12] In future work, we will endogenize the wife's divorce decision by allowing another option for the wife: leave the relationship and choose the level of transfer payments in this case (possibly zero). This will probably be the case as long as $u_w(Y_w - t, x_h, x_w) - Cw < v_w(Y_w, x_w)$.

Next we consider the husband's incentive to make violent threats and the determinants of the amount of transfer demanded. In equilibrium, satisfied husbands will never make violent threats, since the cost of threatening the wife with physical abuse is infinite (by assumption). Among dissatisfied ones, 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 violent threats is too high will not make transfer demands and will behave so as to achieve the inefficient intra-household household allocation equilibrium. Specifically, there will be a threshold value of the cost of making violent threats (η^*) for which a dissatisfied husband is indifferent between making the threat and obtaining the transfer $t^w(1)$ and using violence.. The value of η^* is determined by:

$$\eta^* = u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h). \tag{3}$$

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

$$B(Y_h, Y_w, x_h, x_w, z) = p(z)\, F_\eta[u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h)] \tag{4}$$

Conditions (2) and (4) allow us to assess how a change in women's income may affect the incidence of violent threats and actual 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 or rejecting the latter – this change could be positive or negative. By implicit differentiation of equation (2),

$$\frac{\partial t^w}{\partial Y_w} = 1 - \left[\frac{\frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) + \mu\left(\frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w) - \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \right)}{\frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w)} \right] \tag{5}$$

Equation (5) suggests that the change in transfer amount demanded ($\partial t^w / \partial Y_w$) is increasing in the change in wife's income if the utility gain from accepting the transfer is sufficiently greater than the "utility gain from achieving the Pareto efficient intra-household allocation" relative to her utility from the inefficient "separate spheres" allocation, or:

$$\frac{1}{\mu}\left[\frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w) - \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \right] > \frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w) - \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \tag{6}$$

It is unclear a priori 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 identity of the marginal partner who will choose to make violent threats, $\eta^*(t^w(Y_w))$:

$$(7) \qquad \frac{\partial B}{\partial Y_w} = p(z) f_\eta \frac{\partial u_h}{\partial I_h}(Y_h + t^w(1), x_h, x_w, \theta = 0) \frac{\partial t^w}{\partial Y_w}$$

As shown in condition (7), the probability that the husband will use threats of violence will increase if and only if the amount of transfer demanded increases as a result of an increase in the wife's income. This is consistent with the traditional joint-cost hypothesis of non-cooperative bargaining games, in which decreasing the size of the surplus decreases the opportunity cost for the aggressor to use violence, therefore increasing the amount demanded in bargaining (e.g., Kennan, 1980).

In summary, 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:

Prediction 1: an increase [decrease] in the threat of use of spousal abuse with no subsequent spousal physical abuse if $\partial t^w / \partial Y_w > 0$ [$\partial t^w / \partial Y_w < 0$].

Prediction 2: a reduction [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 change in the threshold value of the husband's cost of using threats leads to the marginal individuals to either strictly prefer to exercise threats of violence and extract resources from their partners, or to use violence and achieve the "separate spheres" inefficient allocation. In the empirical section, we essentially test these empirical predictions of the model using the variation in women's income driven by the public transfer program.

IV. Oportunidades Program, Data, and Social Context

A Overview of the Oportunidades Program

In 1997, the Mexican government initiated a large-scale Education, Health, and Nutrition Program ("PROGRESA") aimed at improving the human development among children in marginalized rural areas in Mexico. "PROGRESA" was renamed "Oportunidades" in 2001 under the Fox Administration. The program targets the poor in marginal rural communities, where 40 percent of

the children from poor households left school after the primary level. The program provides cash transfers to the mothers of over 2.6 million children conditional on school attendance, health checks and health clinics participation, at an annual cost of approximately one billion dollars, or 0.2 percent of Mexico's GDP. The education component of Oportunidades consists of subsidies provided to mothers, contingent on their children's regular attendance to school. 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 per month per family in 1998). The health and nutrition component of the program focuses on cash transfers based on participation by mothers in monthly health talks with the local health care provider, vaccinations and health checks of all children under 5 years old, and biannual health checks of all household members. Overall, the program transfers are important, representing 10 percent of the average expenditures of beneficiary families (Bobonis 2006). This eligibility information will be important in our construction of the eligible women sample (see Section IV.B).

We next briefly discuss the targeting and phase-in of the program. Targeting of the program was done at two levels. First, eligible localities were identified on the basis of clear eligibility rules. Program officials used locality-level characteristics from the 1995 Population Mini-Census to construct a marginality index for each locality, an index that reflected the degree of marginalization of communities and was correlated with the incidence of poverty in the locality.[13] 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.[14] Therefore, within each eligible community, only households below a welfare 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, however, very few changes were made (Skoufias et al. 1999).

[13] 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 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).

[14] Within a subsample 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 (i) was poor (marginality grade 4) or very poor (marginality grade 5) out of a scale from 1 to 5 based on the locality-level marginality index, (ii) had access to a primary school, (iii) had access to a secondary school, (iv) had access to a health center, and (v) was rural (defined as inhabited by fewer than 2,500 people), but had at least 50 inhabitants (Skoufias et al. 1999). Criterion (v) 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. Appendix Figure A1 depicts the distribution of village-level beneficiary households by year and the village-level marginality index, for the period 1997-2004.[15]

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 thus focus our identification strategy and analysis strictly using the variation in phase-in of the program in rural areas.

B. Data and Summary Statistics

The empirical analysis is based on the Mexican National Survey on Relationships within the Household (ENDIREH Survey), a nationally representative household survey measuring the prevalence and intensity of domestic violence, among other intra-household dynamics. The survey, administered to 54,230 households during the months of October and November, 2003, contains data on household demographics, socio-economic characteristics, marital history, 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 previous twelve months. It was administered to women 15 years or older living with a husband or partner; only one eligible woman per household was interviewed.[16] Following is a detailed description of the construction of the different measures of violence used in the analysis.[17] The exact survey questions are included in the Data Appendix.

[15] We use administrative data on the number of beneficiary households in a locality for each year and the 2000 Mexico Census number of households in each locality to construct the estimates of the proportion of beneficiary households plotted.

[16] Although roughly 34,000 women were surveyed, many observations have missing data for at least one variable included in the analysis. The sample of women with complete data is reduced to 26,183 observations.

[17] This follows closely the description provided in the documentation and results of the survey in Castro et al (2004).

Incidence of violence measures consist of dichotomous (1/0) variables indicating whether the female partner had suffered physical, sexual, emotional, or economic abuse from her spouse or partner within the past year (12 months). In the case of both physical and sexual violence, a single incident reported within the past year is classified as violence. That is, the physical violence indicator is equal to one if the woman answers affirmatively to at least one question about 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); therefore, constructing incidence of emotional violence measures is a very 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 two different measures of emotional abuse incidence, a measure of incidence of violent threats, and assess how results may be sensitive to these definitions. A single incident of emotional abuse is not necessarily classified as violence. 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, leaves all the housework and childcare to her even when he has time, humiliates her ("Did he make you feel ashamed, belittled you, said you were ugly or compared you to other women?"), destroys or hides things that belong to her or the household, gets very upset if she does not finish domestic work/the food is not to his liking/he believes she has not fulfilled her duties, accuses her of cheating, locks her up and prohibits her from leaving the house or having visitors, ignores her/does not take her into account/does not give her affection, has made her feel fear, 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/rifle, or a partner who has threatened to kill himself/kill her/ kill the children.

The emotional violence indicator (1) 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 answers "yes" to one of the "high" severity emotional violence questions. This measure involves to a significant extent perceptions of feelings 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 (2) restricts the construction of the variable to those measures of emotional abuse which are least likely to involve the woman's perceptions: whether the partner destroys or hides things that belong to her or the household, locks her up and prohibits her from leaving the house or having visitors, and the threats of various forms. Finally, we construct a violent threat measure which strictly includes the responses to the threat questions mentioned above.[18,19]

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, this measure may over-report the receipt of Oportunides benefits. Figure 1 graphically represents the distribution of beneficiary households based on the village-level marginality index using the household survey data. 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. In addition, the correlation of the proportion of beneficiary households using the survey and administrative data for 2003 is 0.84, which suggests that the information from the household survey closely represents receipt of Oportunidades benefits.

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[18] We also construct measures of economic violence, based on the possibility that partners' reactions in terms of resource extraction and economic threats can be partially captured with these. In terms of economic violence, "low" severity economic abuse includes: a partner who complains about how a woman spends money, has been stingy with household expenses even if he has money, has threatened not to or refused to give her money for household expenses, has spent all the money needed for household expenses. "High" severity economic violence includes actions such as taking over/appropriating/taking away money or goods (things, land parcels, animals, etc.), or forbidding her from working or studying. The economic violence indicator construction follows an analogous rule to the emotional violence indicators, based on the degree of severity assigned to the responses.

[19] 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, the quality of the severity and intensity data is quite limited, and we do not use these in the main analysis.

Since we are interested in identifying the effects of women's income changes on spousal violence outcomes against women, using the complete sample of households may confound the income effect and the conditionality effects of the program (i.e., the fact that households only received cash if children were in school and satisfy the conditions from the health and nutrition components). Schultz (2004) presents evidence that school enrollment rates were close to 100 percent for primary school children among both program and comparison village children in a randomized evaluation of the program, and therefore the program had no impacts on primary school enrollment. Since conditionality constraints are not likely to be binding for households with primary school children (based on this evidence) and in order to minimize the confounding with the program conditionality effects, we restrict the sample to two groups: (i) intact households with children ages 11 years and younger at baseline, who are not old enough to attend secondary school, and (ii) intact households with children reported to have completed less than six years of schooling (primary school) or with children under 5-years old. These samples allow us to better identify households who are likely to be eligible to receive program benefits based on their demographic composition. Also, as will be discussed in Section V, this sample restriction allows us to construct comparable groups of beneficiary and non-beneficiary households to perform the empirical analysis. In the analysis section, we present all results for sub-sample (i), but have confirmed that the results are robust to using sub-sample (ii); these are available from the authors upon request.

We also restrict the sample to women ages 25 and older, based on the fact 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, potentially improving their socio-economic status before marriage (women in the sample were 19 years old and older during 1997, at the start of the initial phase-in of the program), and limiting potential confounding due to marital sorting based on the tolerance for spousal abuse (Pollak, 2002). These restrictions result in a 2,867 household sample.

As reported by women in the sample, spousal violence is a pervasive phenomenon in rural Mexico; 40 percent of women in the sample report having experienced to have some form of spousal violence within the last year, be it physical, sexual, emotional or economic (Table 1, Panel A). The distinction between types of violence is important, as the overall incidence of different forms of violence varies substantially (Panel A). The single most common form of abuse is emotional, with a third (32 percent) of women in the sample experiencing some form of emotional violence in the past year. About a quarter of women (22 percent) in the sample experienced economic violence in the same period, which involves some sort of restriction on their economic

agency. The prevalence of physical and sexual violence is similar with roughly 11 percent reporting having experienced some form of physical violence, and 9 percent reporting some act of sexual violence 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 developed country standards (González-Brenes, 2005). Comparing violence incidence rates between beneficiary and non-beneficiary women, we find some evidence of reductions in physical and emotional 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, Panel B). 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 (assumed subsequent) acts of physical or sexual abuse is quite low in the population; these range between 3-6 percent in the population.[20] These various threat indicators will help us measure the extent to which the program induces a change in conflictive behavior among partners (see Section III).

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 these women have no schooling, although two thirds of them (65 percent) have completed some primary school (Table 2, Panel A). A non-negligible share (20 percent) of the women in the sample come from an indigenous background (14 percent), based on the linguistic definition of indigenous background. The women's average age is approximately 35 years, 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 have high tolerance for spousal abuse, thus explaining the high prevalence of abuse reported above (Pollak, 2002).

[20] We focus the analysis on threats of violence using (i) the threat of physical abuse and (ii) the emotional violence (2) indicator measures, which exclude or minimize the extent of women's biases in the measures due to their perceptions regarding what constitutes psychologically violent behavior. We report the summary statistics using the (iii) emotional violence indicator (1) strictly for comparison purposes.

Most partners of these women 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 (Panel B). Interestingly, approximately 19 percent of partners live in an unmarried 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 partners exposed to spousal abuse between her 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, 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, rows 2-4). Various potential reasons for this endogenous (self-) selection into the program may be:

(i) the *targeting mechanism* tries to ensure that low socio-economic status households are the actual program beneficiaries (Skoufias, Davis, and de la Vega, 2001);
(ii) *program take-up* may be endogenous, based on the extent of women's decision-making power within the household;
(iii) beneficiary households 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 options outside of current marriages - leading to a negatively selected sample of households in union;
(iv) 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) (Imbens, 2004; Rubin, 1974).

To deal with these violations, 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 this conditional unconfoundedness assumption, treatment assignment is assumed independent of the potential outcomes conditional on a set of observed pre-treatment variables (Imbens, 2004; Rosenbaum and Rubin, 1983; Rubin, 1978). 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 large 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 determinants.[21] 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 were directly benefited as children from program benefits (which started in some villages in 1997), changing their socio-economic characteristics, or possibly affecting their marital matching patterns.[22]

Using this specific sub-sample, we first present ordinary least squares estimates of the ATE, which condition on a large 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:

$$Y_{iv} = \theta \cdot T_{iv} + X_{iv} \cdot \beta + \alpha_v + \varepsilon_{iv}, \quad (8)$$

where the treatment indicator T_{iv} equals one for beneficiary household *i* in villages *v* and zero otherwise, X_{iv} are pre-determined covariates that are potentially significantly correlated with T_{iv} and

[21] In future versions of the analysis, we will also condition and match on households' asset holding patterns, which should improve our conditioning on the actual determinants of the welfare index for within-village eligibility selection.
[22] Bobonis (2006) finds that the low divorce rates (approximately 0.5 percent per year) and remarriage rates prevalent among couples in Oportunidades-eligible households in rural Mexico, did not substantially increase as a result of the program, reducing concerns of divorce and spousal-matching sample selection driving our reported results.

Y_{iv}, conditional on treatment, 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:

$$\hat{\theta}_M = \frac{1}{N}\sum_i \rho_i \cdot \left(T_{iv}\hat{Y}_{1iv} + (1-T_{iv})\hat{Y}_{0iv}\right) \tag{9}$$

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 $T_{iv} = 0$.[23, 24]

VI. Results

Under the conditional unconfoundedness assumption, average treatment effects of the program on spousal violence 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

Very broadly, we find evidence that 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 (30-55 percent) in the reports of physical abuse incidence (row 2). Our preferred matching estimate (with bias adjustment) implies an impact of 3.6 percentage points, or 33 percent (significant at 95 percent confidence). The impacts on

[23] In a future version of the paper, we will include estimates based on the Hirano et al. (2000) more efficient weighted least squares (WLS) estimator with weighting on the inverse of a non-parametric estimate of the propensity score.
[24] We also attempted to estimate regression discontinuity design (RDD) estimates of the program impacts on domestic violence, using the discontinuity in village program eligibility until the year 2000. However, since the program was expanded to less marginal localities from 2001 onwards, it became impossible to use this research deisgn to identify program impacts in 2003.

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 31-34 percent range (significant at 95 percent confidence), and a less-precisely estimated but greater (in magnitude) 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 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 the first emotional violence measure, which includes women's perceptions of emotional abuse (see Section IV.B), suggest moderate impacts in the range of 10-18 percent, although these are most statistically indistinguishable from zero (row 5). Using the second measure, which excludes the female partner's clear perception measures, suggest moderate increases of 20-35 percent in the incidence of emotional violence, although again these estimates are insignificantly different from zero (row 6).

The results indicate substantial reductions in physical abuse – but not other forms of male-to-female spousal abuse – among beneficiary households. These are consistent with the idea that increases in women's income generate a greater incidence of violent threats by partners which females abide to, therefore reducing the actual acts of physical abuse. Moreover, the latter estimates of emotional violence suggest that the incidence of the pattern of verbal non-physical abuse in the household may be increasing, and we need to distinguish whether there is some degree of substitution in the male partners' use of physical and emotional abuse, as predicted by the theoretical framework. This is examined in more detailed in the following subsection.

B. Program Impacts on Threats of Spousal Violence

The Oportunidades program led to substantial increases in the incidence of violent threats or acts of emotional violence with no (assumed subsequent) acts of physical or sexual abuse, in some cases more than doubling the incidence of these behavior patterns (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 2.8-4.8 percentage points (significant at 85-90 percent confidence), essentially a doubling of the incidence of these violent threats (row 2). The results are robust to expanding the definition of physical abuse to include sexual abuse, with estimates ranging from 2.7 to 4.5 percentage points (significant at 85-90 percent confidence) (row 3). This robustness test is expected, since the violent threat measure includes threats of sexual abuse. However, note that the point

estimates and significance levels are reduced in both cases when we fail to adjust for bias in the case-control matching estimates (rows 2-3, column 5).

The emotional violence (excluding women's perceptions) indicator, which, apart from including violent threats, incorporates actions that may affect female partners' psychosocial status, may be a better measure of threats or non-physical abuse. Using this indicator as our measure of non-physical abuse, and conditioning on a lack of physical violence, we find substantial increases in reports of this type of behavior among male partners (row 4). The point estimates indicate increases of 3.8-5.7 percentage points, or 70-100 percent (significant at conventional confidence levels). Again, these results are robust to conditioning on a lack of prevalence of physical or sexual abuse (row 5).

Using the alternative measure of emotional abuse which includes responses to women's perceptions of abuse suggest no significant increase in abuse without subsequent physical or sexual abuse; the point estimates imply effects that range between an 8 percent decrease and a 21 percent increase (rows 6-7); none of the estimated impacts are significantly distinguishable from zero. However, we have less confidence in the latter results, since these measures, by including women's perceptions of what represents emotional abuse and these being affected by the degree of women's empowerment within the household, may have errors correlated with the receipt of program-based transfers, possibly biasing the effects towards zero, and failing to fully capture changes in male partner's actions.

In summary, the results provide evidence of a substantial reduction in physical abuse – but an increase in male partners' use of threats of or emotional abuse with no (subsequent) physical or sexual abuse – among beneficiary households as a result of the program. These are consistent with increases in women's income generating a greater incentive for male partners' to use emotional violence or threats of physical violence to extract rents from the wife's greater endowment, with subsequent increases in the proportion of women who satisfy these coercive demands, and therefore reducing the incidence of actual physical or sexual abuse. The empirical evidence confirms this substitution between physical and non-physical forms of spousal abuse.

VII. Conclusion

The main aim 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 30 percent less likely to be victims of physical and sexual 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 use of spousal abuse with no subsequent physical abuse than women in non-beneficiary households.

As a second contribution, we present a theoretical framework adapting Bloch and Rao (2002)'s asymmetric information model of domestic violence in household bargaining to understand how male partners may use threats of and actual violence as instruments to extract rents from their female counterpart's share of the marital surplus. In this set-up, male partners signal their dissatisfaction with marriage through the use of threats of violence and demand rent transfers from wives if they have an incentive to do so. Acts of violence are then a response to the 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, then 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, consistent with the empirical findings.

The findings outlined in this paper have important policy implications, since the evidence presented provides a mixed view of conditional cash transfer programs' effectiveness in improving women's empowerment within the household, since these 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 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 efficiency of intra-household resource allocation decisions (Ligon, 2002; Basu, 2006; Lundberg and Pollak, 2003; Ashraf, 2006; Bloch and Rao, 2002). As presented in our particular intra-household bargaining framework, information asymmetries may lead to multiple equilibria in which violent (non-violent) households achieve a Pareto inefficient (efficient) allocation equilibrium, and may therefore impose additional constraints on tests of Pareto efficiency in intra-household allocations (e.g. Udry, 1996; Browning and Chiappori, 1998).

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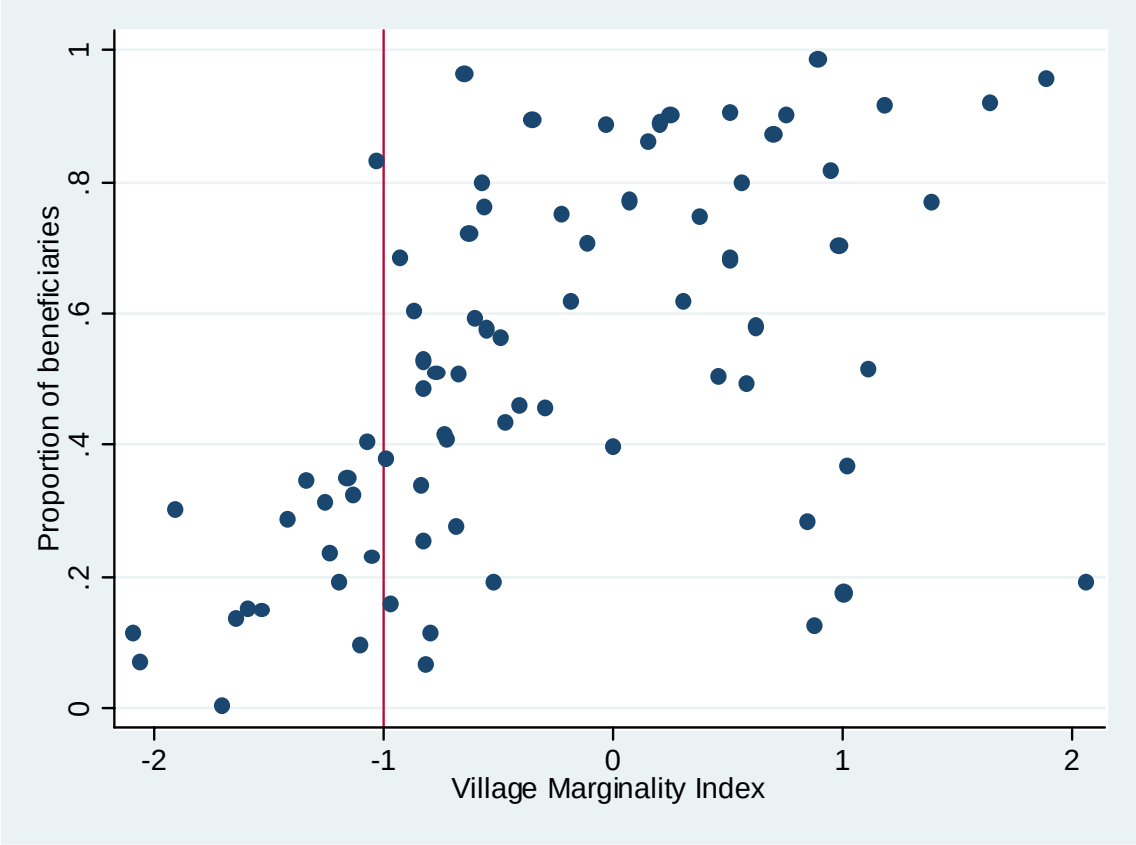
Figure 1: Proportion of Beneficiary Households, by Village-Level Marginality Index
Year 2003 (ENDIREH Survey Data)



Notes to Figure 1: The sample encompass all women ages 25 and older in rural villages classified as potentially program eligible – with children ages 11 and younger. Each dot in the graph represents the proportion of beneficiaries in the percentile of the village marginality index distribution. The vertical solid line represents the threshold marginality level which distinguishes the early program (1997/98) villages and the late phase-in (2000/01) program villages.

Table 1: Description of key variables: Male-to-Female spousal abuse and violent threats

Variable Name	Description	Sample Mean [Std Dev]		
		All	Ben	Non-Ben
Panel A: Incidence of Spousal Violence				
Any violence	Indicator (1/0) if any occurance of physical, sexual, emotional, or economic abuse	0.40	0.37	0.42
Physical violence	Indicator (1/0) if any occurance of physical abuse (e.g., push, beating, attack with blade)	0.11	0.09	0.13
Physical abuse & threat of violence	Indicator (1/0) if any occurance of physical abuse or threat of physical abuse	0.12	0.10	0.14+
Sexual violence	Indicator (1/0) if any occurance of sexual abuse (e.g., use of force to have sexual relations)	0.09	0.08	0.10
Emotional violence (1)	Indicator (1/0) if any occurance of psychological abuse, including perceptions questions (e.g., made you feel fear)	0.32	0.28	0.35*
Emotional violence (2)	Indicator (1/0) if any occurance of psychological abuse, excluding perceptions questions (e.g., locked you in, threatened to leave you)	0.11	0.10	0.12
Economic violence	Indicator (1/0) if any occurance of economic abuse (e.g., taken away or taken over money or goods)	0.22	0.19	0.25*
Panel B: Threats of Spousal Violence				
Threat of physical violence	Indicator (1/0) if any occurance of physical abuse threat (e.g., threat of leaving, threat w/ deadly weapon, threat to kill)	0.08	0.07	0.09
Threat & no physical violence	Indicator (1/0) if occurance of threat, but no incidence of physical violence	0.03	0.04	0.03
Threat & no physical/sexual violence	Indicator (1/0) if occurance of threat, but no incidence of physical or sexual violence	0.03	0.03	0.02
Emotional viol. (1) & no physical violence	Ind. (1/0) if occurance of emotional violence (w/ perceptions), but no incidence of physical violence	0.22	0.21	0.23
Emotional viol. (1) & no physical/sexual violence	Ind. (1/0) if occurance of emotional violence (w/o perceptions), but no incidence of physical violence	0.19	0.18	0.19
Emotional viol. (2) & no physical violence	Ind. (1/0) if occurance of emotional violence (w/ perceptions), but no incidence of physical violence	0.06	0.06	0.05
Emotional viol. (2) & no physical/sexual violence	Ind. (1/0) if occurance of emotional violence (w/o perceptions), but no incidence of physical violence	0.04	0.05	0.03

Notes for Table 1: 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 (1)	Beneficiary (2)	Non-Beneficiary (3)	Ben. - Non-Ben. (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 for Table 2: 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 the Program on Spousal Abuse

Dependent Variables:	Coefficient Estimate on Beneficiary Status (s.e.)						Mean of dep. variable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS estimate		Matching estimate		Matching estimate		
	ATE	%Δ	ATE	%Δ	ATE	%Δ	
Any violence indicator	-0.029	-7%	-0.045^{+}	-11%	-0.023	-6%	0.395
	(0.053)		(0.031)		(0.031)		
Physical violence indicator	-0.060*	-55%	-0.036**	-33%	-0.031*	-29%	0.108
	(0.035)		(0.017)		(0.017)		
Physical violence + violence threat indicator	-0.057^{+}	-48%	-0.041**	-34%	-0.037**	-31%	0.120
	(0.035)		(0.018)		(0.018)		
Sexual violence indicator	-0.066**	-73%	-0.022	-24%	-0.020	-22%	0.090
	(0.029)		(0.016)		(0.016)		
Emotional violence indicator	-0.027	-9%	-0.056*	-18%	-0.032	-10%	0.315
	(0.051)		(0.030)		(0.030)		
Emotional violence indicator 2	0.041	36%	0.026	23%	0.022	20%	0.113
	(0.036)		(0.018)		(0.018)		
Economic violence	-0.042	-19%	-0.032	-14%	-0.027	-12%	0.223
	(0.041)		(0.030)		(0.030)		
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2867		2867		2867		

Notes to Table 3: 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-paametric 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 the Program on Violent Threats

	Coefficient Estimate on Beneficiary Status (s.e.)						Mean of dep. variable
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS estimate		Matching estimate		Matching estimate		
Dependent Variables:	ATE	%Δ	ATE	%Δ	ATE	%Δ	
Threat of violence	0.004	6%	0.010	12%	0.004	5%	0.079
	(0.036)		(0.021)		(0.021)		
Threat of violence & no physical violence	0.048+	144%	0.028*	85%	0.016	50%	0.033
	(0.031)		(0.017)		(0.017)		
Threat of violence & no physical/sexual violence	0.045+	160%	0.027*	95%	0.015	52%	0.028
	(0.031)		(0.017)		(0.017)		
Emotional violence (2) & no physical violence	0.057+	102%	0.047***	84%	0.038**	68%	0.056
	(0.037)		(0.013)		(0.013)		
Emotional violence (2) & no physical/sexual violence	0.063*	146%	0.050***	117%	0.042***	97%	0.043
	(0.033)		(0.013)		(0.013)		
Emotional violence (1) & no physical violence	0.016	7%	-0.018	-8%	-0.004	-2%	0.221
	(0.050)		(0.027)		(0.027)		
Emotional violence (1) & no physical/sexual violence	0.039	21%	0.006	3%	0.020	11%	0.187
	(0.046)		(0.027)		(0.027)		
Village Fixed Effects (or Matching within Village)	Yes		Yes		Yes		
Bias Adjustment	-		Yes		No		
Observations	2867		2867		2867		

Notes to Table 4: 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-paametric 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.

Appendix

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", "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?

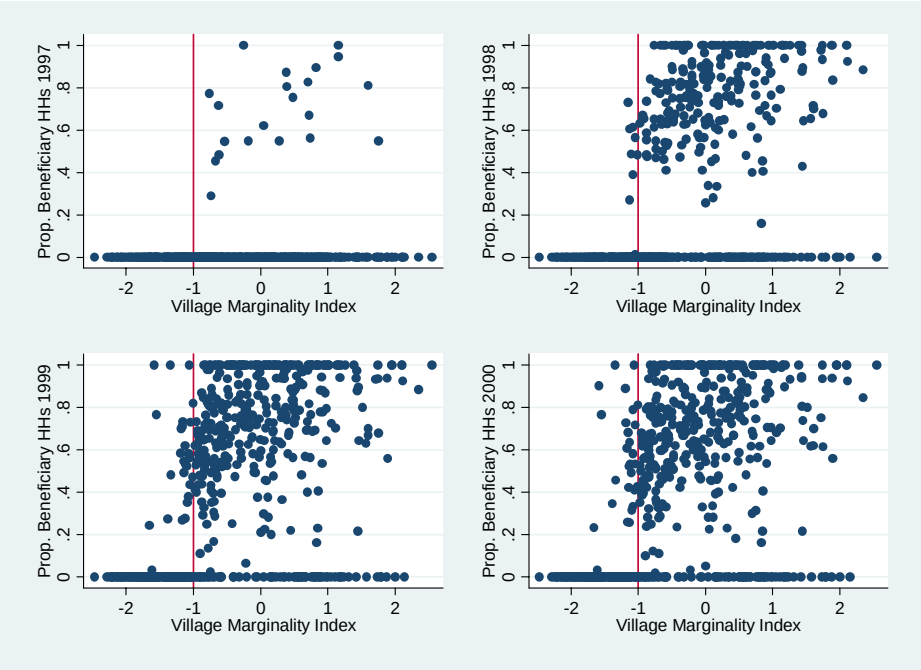
D. Economic Violence

In the past twelve months, has your spouse/partner…

1. Complained about how you spend money?
2. Been stingy with household expenses even when he had money?
3. Threatened not to give you money for household expenses or not given you money [for household expenses]?
4. Spent all the money needed for the home?
5. Taken away or taken over money or goods (things, land parcels, animals, etc.)?
6. Forbidden you from working or studying?

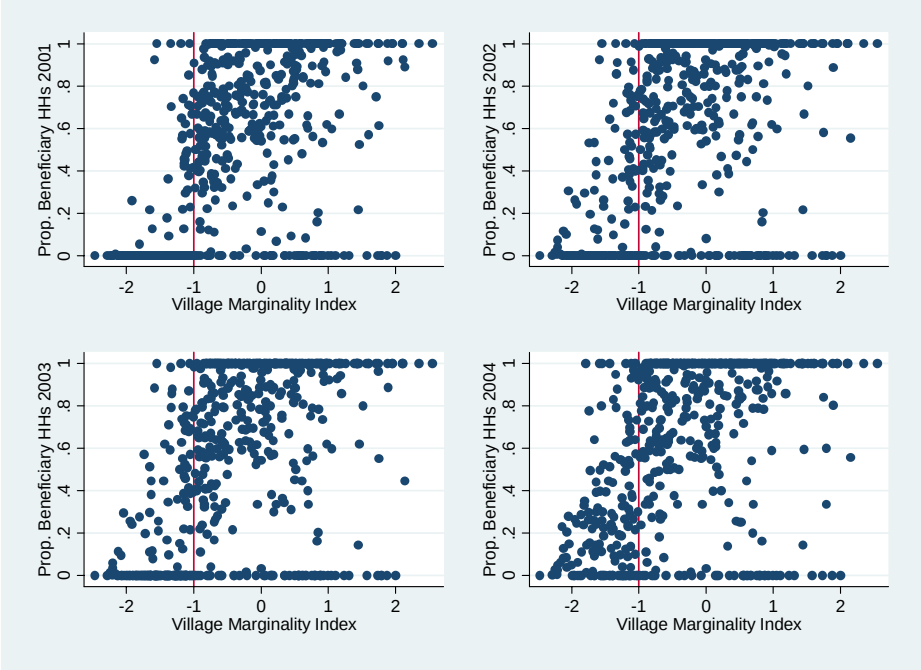
Figure A1: Proportion of Beneficiary Households, by Village-Level Marginality Index
Years 1997-2004

Panel A: Year 1997 Panel B: Year 1998



Panel C: Year 1999 Panel D: Year 2000

Panel E: Year 2001 Panel F: Year 2002



Panel G: Year 2003 Panel H: Year 2004

Notes to Figure A1: Each dot in the graph represents the proportion of beneficiaries in a village. Sources: Number of beneficiary households from Oportunidades administrative data; total number of households from 2000 Mexico Census.