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

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A. Data Appendix

We use data from Mexico's National Survey on Relationships within the Household (ENDIREH) 2003. 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. See Castro et al (2006) for more details.

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?*

Incidence of Violence Measures

Dichotomous variables indicating whether the female partner suffered physical, sexual, emotional, or economic abuse from her spouse or partner in the past 12 months.

1) *Physical and sexual violence*: a single incident reported within the past year is classified as violence.

2) *Emotional violence*: We categorize the survey questions as “low” or “high” severity. “Low” severity emotional abuse includes a partner who stops speaking to a woman, humiliates her, 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 (questions 1-11 above). We categorize the last two questions (questions 12 and 13) as “high” severity emotional violence. Additionally, we restrict the questions used in the analysis 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 (questions 3, 6, 12, 13). The emotional violence indicator is equal to one if (i) a woman 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.

3) *Threat of violence*: Indicator variable for the responses to the threat questions (12, 13) mentioned above.

Female Partner Decision Making Power Measure

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

B. Methodological Appendix

We estimate ordinary least squares estimates of the average treatment effect (ATE), conditioning flexibly on a 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:

$$(1) \quad Y_{iv} = \theta \cdot T_{iv} + X_{iv} \cdot \beta + \alpha_v + \varepsilon_{iv},$$

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 cluster standard errors at the village level. Under the usual conditional unconfoundedness condition, the estimates of θ are those of the ATE.

Dealing with Endogenous Selection into the Treatment within Villages

We rely on within-village heterogeneity in eligibility for the program, due to the program's strong village-level targeting. Because our village-level cell sizes are small (at most 10 households), we cannot adequately implement non-parametric or semi-parametric methods such as propensity-score matching or case-control matching (see Imbens 2004). In order to address the potential concerns of unobserved heterogeneity in the within-village household comparison (equation (1)), we pursue a set of tests and sensitivity analyses inspired by the work on diagnostics of selection on observable and unobservable variables (i.e., Imbens 2003; Altonji, Elder and Taber 2005). We carry out the following procedure:

(1) Identify which observable characteristics (X_{iv}) that are correlated with treatment assignment (T_{iv}) are also significant predictors of spousal abuse outcomes (Y_{iv}), as these may plausibly be the covariates most correlated with the unobservable characteristics that jointly determine program eligibility/take-up and abuse outcomes.

(2) Evaluate the robustness of the results to flexible specifications that allow for high-order and interaction terms between these variables.

Specifically, we estimate linear model (1) for each of the dependent variables of interest, and examine which observable characteristics have strong predictive power on the outcomes conditional on treatment, based on statistical significance and predictive power. We also examine which of these covariates predict treatment receipt within-village from the estimates of within-village average differences between beneficiary and non-beneficiary households, reported in Table 2. We report these estimates in Table A1 (see below). For instance, we identify that the female partner's indigenous status is an important predictor of spousal violence but is not strongly correlated with beneficiary status, whereas partner's age is both a predictor of abuse and distinct across beneficiaries and non-beneficiaries within villages.

The following covariates are identified as strong predictors of spousal abuse outcomes and are also correlated with the individual's beneficiary status: (1) woman's age, (2) partner's age, (3) partner's schooling, (4) family size, and (5) years in union. We evaluate the robustness of the results to flexible specifications that allow for high-order and interaction terms between these variables, and also include interactions with the woman's levels of education. The results obtained from this sensitivity analysis are qualitatively and quantitatively similar across specifications.

Table A1: Within-village predictors of male-to-female spousal violence and beneficiary status

	Dependent variables:								Covariate Difference in Means (Ben. - Non-Ben.) (9)
	Physical violence		Sexual violence	Emotional violence	Threat of physical violence				
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS	
Beneficiary	-0.062* (0.032)	-0.063* (0.032)	-0.066* (0.039)	-0.062* (0.038)	0.041 (0.040)	0.031 (0.035)	0.025 (0.037)	0.022 (0.032)	
Woman's age	0.007 (0.005)	0.008* (0.005)	0.006 (0.005)	0.007 (0.005)	0.008* (0.005)	0.009** (0.005)	0.008* (0.004)	0.009** (0.004)	1.24 (1.11)
Indigenous woman	-0.042 (0.050)	-0.060 (0.051)	-0.008 (0.046)	-0.029 (0.045)	-0.160** (0.079)	-0.171** (0.079)	-0.172** (0.077)	-0.192** (0.078)	0.00 (0.01)
No schooling	0.105 (0.078)	0.098 (0.085)	-0.152 (0.123)	-0.152 (0.114)	-0.137 (0.136)	-0.177 (0.124)	-0.080 (0.110)	-0.099 (0.097)	0.02 (0.02)
Primary school	0.063 (0.047)	0.068 (0.060)	-0.098 (0.097)	-0.092 (0.089)	-0.100 (0.116)	-0.126 (0.100)	-0.065 (0.089)	-0.071 (0.072)	0.10 * (0.05)
Middle school	0.023 (0.057)	0.030 (0.060)	-0.090 (0.100)	-0.077 (0.092)	-0.128 (0.144)	-0.146 (0.125)	-0.080 (0.116)	-0.079 (0.098)	-0.05 (0.04)
Secondary school	0.068 (0.049)	0.080 (0.055)	-0.071 (0.088)	-0.050 (0.081)	-0.025 (0.137)	-0.036 (0.124)	0.013 (0.114)	0.013 (0.103)	-0.04 * (0.02)
Spousal violence in woman's childhood	0.058 (0.047)	0.068 (0.047)	0.052 (0.047)	0.048 (0.048)	0.081 (0.065)	0.090 (0.067)	0.059 (0.045)	0.065 (0.042)	0.01 (0.04)
Partner's age	-0.012*** (0.004)	-0.011*** (0.004)	-0.005 (0.005)	-0.005 (0.005)	-0.011** (0.004)	-0.011*** (0.004)	-0.010** (0.004)	-0.010*** (0.004)	3.04 *** (1.08)
Indigenous partner	0.085 (0.080)	0.119 (0.081)	-0.088** (0.041)	-0.081* (0.046)	0.159 (0.110)	0.163 (0.105)	0.184* (0.111)	0.186* (0.108)	-0.01 (0.02)
Partner's schooling	-0.010* (0.005)	-0.009* (0.005)	-0.007* (0.004)	-0.006* (0.004)	-0.002 (0.004)	0.001 (0.005)	-0.004 (0.004)	-0.002 (0.004)	-1.35 *** (0.32)
Spousal violence in partner's childhood	0.045 (0.054)	0.035 (0.057)	0.056 (0.039)	0.056 (0.039)	0.135** (0.064)	0.133** (0.060)	0.077 (0.048)	0.072 (0.046)	-0.06 (0.06)
Cohabiting couple	0.095*** (0.035)	0.084** (0.034)	0.023 (0.038)	0.011 (0.035)	0.091** (0.036)	0.072** (0.033)	0.081** (0.035)	0.062* (0.032)	-0.06 (0.06)

Family size	-0.009 (0.007)	-0.013 (0.008)	-0.011 (0.010)	-0.015 (0.011)	-0.004 (0.010)	0.001 (0.009)	-0.002 (0.008)	0.001 (0.008)	0.66 *** (0.19)
Years in union	0.005 (0.004)	0.004 (0.004)	0.008** (0.003)	0.007** (0.003)	0.007 (0.005)	0.007* (0.004)	0.006 (0.004)	0.006 (0.004)	2.30 * (1.26)
Dirt floor		0.028 (0.052)		0.038 (0.052)		0.008 (0.090)		-0.007 (0.037)	0.03 (0.05)
Firm floor		-0.003 (0.037)		0.005 (0.043)		-0.019 (0.064)		-0.017 (0.025)	0.02 (0.05)
Private water tap		-0.119** (0.056)		-0.026 (0.058)		-0.036 (0.047)		-0.036 (0.040)	0.00 (0.06)
Access to public tap		-0.125 (0.077)		-0.050 (0.058)		-0.019 (0.089)		-0.072 (0.044)	0.02 (0.01)
Electricity		0.062 (0.069)		-0.134 (0.105)		0.008 (0.071)		0.038 (0.059)	0.01 (0.02)
Telephone		-0.003 (0.041)		0.026 (0.037)		-0.096*** (0.033)		-0.032 (0.026)	-0.08 * (0.04)
Radio		0.022 (0.029)		-0.020 (0.026)		0.000 (0.027)		-0.027 (0.024)	0.06 (0.04)
Drainage		-0.009 (0.041)		-0.034 (0.046)		0.009 (0.027)		-0.014 (0.022)	0.00 (0.04)
Kitchen		-0.046 (0.054)		-0.030 (0.046)		-0.079 (0.050)		-0.092* (0.053)	-0.02 (0.05)
Num. of bedrooms		0.029 (0.033)		0.045* (0.027)		-0.027 (0.030)		-0.013 (0.020)	0.02 (0.12)
Num. of rooms		-0.015 (0.017)		-0.016 (0.016)		-0.007 (0.018)		-0.007 (0.010)	-0.16 (0.20)
Village Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2867	2867	2867	2867	2867	2867	2866	2866	2867
R-squared	0.35	0.36	0.37	0.39	0.35	0.37	0.38	0.39	-

Notes: Robust standard errors in parentheses, clustered at the village level; significant at (*) 90 percent, (**) 95 percent, (***) 99 percent confidence levels. Coefficient estimates from village fixed effects regressions weighted by survey sampling weights. Covariate difference in means across beneficiary and non-beneficiary households are reported in column 9; in bold if covariate is significant predictor of violence. The variables “no schooling”, “primary school”, “middle school”, “secondary school” are indicator variables for the educational attainment of female partners.

Table A2: Comparison of Means by Beneficiary and Non-Beneficiary Households, by Marital Status (Marriage/Cohabitation)

Pre-treatment Covariate	Married Couples			Cohabiting Couples		
	Sample Means		Difference in Means	Sample Means		Difference in Means
	Ben.	Non-Ben.	Within Villages	Ben.	Non-Ben.	Within Villages
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Panel A:</u> Female Partner Characteristics						
Woman's age	35.6	35.0	1.53	32.5	33.7	-4.97
Indigenous woman	0.20	0.07	-0.01	0.21	0.09	-0.02
No schooling	0.09	0.05	0.00	0.21	0.05	0.20 ***
Primary school	0.73	0.61	0.11 *	0.61	0.54	-0.17
Middle school	0.14	0.22	-0.05	0.16	0.22	0.05
Secondary school	0.02	0.05	-0.03 **	0.01	0.10	-0.07
Spousal violence in woman's childhood	0.11	0.09	0.04	0.04	0.14	-0.05
<u>Panel B:</u> Partner and Household Characteristics						
Partner's age	38.9	37.8	2.2	35.9	34.4	5.9 *
Indigenous partner	0.20	0.08	-0.02	0.19	0.14	0.00
Partner's schooling attainment	5.0	6.2	-1.2 ***	5.1	6.9	-1.0 **
Spousal violence in partner's childhood	0.15	0.21	-0.05	0.14	0.17	-0.06
Cohabiting couple	0.00	1.00	-	1.00	0.00	-
Family size	6.4	5.4	0.6 ***	5.9	5.3	0.3
Years in union	16.8	14.9	2.5 **	12.6	12.1	-5.7
<u>Panel C:</u> Other Household Characteristics						
Dirt floor	0.33	0.18	0.05	0.50	0.33	0.05
Firm floor	0.64	0.68	0.01	0.49	0.59	-0.04
Access to water - private tap	0.60	0.81	-0.04	0.61	0.64	0.31
Access to water - public tap	0.06	0.02	0.02	0.04	0.07	-0.04
Electricity	0.91	0.98	-0.01	0.94	0.95	0.07
Telephone	0.12	0.21	-0.08	0.03	0.16	-0.05
Radio	0.77	0.83	0.04	0.67	0.64	0.17
Drainage	0.62	0.78	0.04	0.48	0.76	-0.17
Kitchen	0.90	0.89	-0.03	0.84	0.85	-0.03
Num. of bedrooms	1.76	1.92	0.02	1.39	1.49	0.15
Num. of rooms	2.87	3.26	-0.13	2.32	2.66	-0.38
Joint Significance Test ($\chi^2(24)$)			168.64	518.24		
[p-value]			[<0.001]	[<0.001]		

C. Theoretical Appendix

Model of Male Partner'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. In this model, 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. This private information enables husbands to use threats of abuse to coercively demand transfers from their wives, and strategically use physical abuse (as a punishment) depending on whether their wife complies with 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 $U_h = u_h(Y_h, x_h, x_w, \theta)$ and $U_w = u_w(Y_w, x_h, x_w)$, where Y_h, Y_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 violence is used, 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, 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 low private 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 $p'(z) < 0$.

In the following stage, the husband makes the decision whether to threaten with physically abusing his wife. Each partner 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 and women's mental health or emotional wellbeing.⁴ In this second stage, we also 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 and/or behaviors of the female partner.⁵ 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 2009, 2011).

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 $V_h = v_h(Y_h, x_h, x_w)$ and $V_w = v_w(Y_w, x_h, x_w)$, 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), $u_h(Y_h, x_h, x_w, \theta=1) > v_h(Y_h, x_h, x_w)$ 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: $u_w(Y_w - t, x_h, x_w) - C_w \geq v_w(Y_w, x_w)$.⁶

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

⁴ The model treats threats of violence as having effects on the utility of partners, but partners' incomes are taken as exogenous. If the act of emotional violence affects the female partner's health – and thus her labor market return – we need to consider the case in which the threats of abuse have a negative effect on the female partner's income, Y_w . The model's predictions are unchanged as long as Assumption 3 continues to hold in this more general case.

⁵ 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 2009, 2011; Jacoby and Mansuri 2006).

⁶ The assumption that the level of spousal abuse that triggers the non-cooperative outcome is physical abuse – rather than forms of emotional abuse such as forcible confinement – generates the result. We think that it is natural to model the tension between threats of violence on one hand and actual physical violence on the other, but Assumption 3 does not need to hold in general. It is not even clear that some dimensions of emotional violence (e.g., forcible confinement, threats of murder) are at a "lower bar" than acts of physical violence.

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:

$$(A1) \quad u_w(Y_w - t, x_h, x_w) \geq \mu v_w(Y_w, x_w) + (1-\mu) u_w(Y_w, x_h, x_w),$$

and the maximal amount that the wife is willing to pay to her husband, $t^w(\mu)$, is the value such that condition (A1) 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 $t^w(1)$, or using violence. The value of η^* is determined by:

$$(A2) \quad \eta^* = u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h).$$

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:

$$(A3) \quad B(Y_h, Y_w, x_h, x_w, z) = p(z) F_\eta[u_h(Y_h + t^w(1), x_h, x_w, \theta=0) - v_h(Y_h, x_h)].$$

Equation (A3), in combination with the equality condition based on (A1), allows us to assess to what extent can a change in women's income may 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 makes her indifferent between accepting and rejecting the transfer demand. By implicit differentiation of equality condition (1):

$$(A4) \quad \frac{\partial t^w}{\partial Y_w} = 1 - \left[\frac{\frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) + \mu \left(\frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w) - \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \right)}{\frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w)} \right].$$

It is clear from equation (A4) 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:

$$(A5) \quad \frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) - \mu \left[\frac{\partial v_w}{\partial I_w}(Y_w, x_h, x_w) \right] < \frac{\partial u_w}{\partial I_w}(Y_w - t, x_h, x_w) - \mu \left[\frac{\partial u_w}{\partial I_w}(Y_w, x_h, x_w) \right].$$

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:

$$(A6) \quad \frac{\partial B}{\partial Y_w} = p(z) f_\eta \frac{\partial u_h}{\partial I_h}(Y_h + t^w(1), x_h, x_w, \theta = 0) \frac{\partial t^w}{\partial Y_w}.$$

As shown in condition (A6), 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 [A5] 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 This is the model's prediction.

Prediction: If marginal increases in women's socioeconomic conditions lead to an increase in the amount of rents that husbands are willing to extract, this will lead to (i) an *increase* in the incidence of threats of spousal abuse *with no associated physical violence* and (ii) a *reduction* in the actual incidence of physical abuse.

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).