

Domestic Violence in Developing Countries: Theory and Evidence

by

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May 2008

ABSTRACT

This paper sets out a simple non-cooperative model of household bargaining that incorporates domestic violence as an instrument for enhancing bargaining power over household resource allocation. We demonstrate that the extent of domestic violence faced by women is not necessarily declining in their outside options, nor necessarily increasing in their spouses'. Using the National Family Health Survey data of India for 1998-99, we provide some evidence for the evolutionary theory of domestic violence, which argues that such violence stems from the jealousy caused by paternity uncertainty in our evolutionary past.

Key Words: domestic violence, female autonomy, patriarchy, evolutionary theory

JEL Classification Numbers:

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1 Introduction

Domestic violence is a universal phenomenon. Irrespective of whether a country is poor or rich, spousal violence is pervasive. However, it has not received as much research scrutiny in economics as it warrants. The incidence of domestic violence in the U.S. is xx, while that in India it is yy. These figures are likely to be underestimates because women who are abused—and it is largely women who suffer serious violence—may be too embarrassed to admit to having experienced such violence, too concerned with embarrassing their abusers or too intimidated to expose them to public censure. This paper deals with the determinants of domestic violence and how this violence impinges on women’s autonomy. We present a simple theoretical framework and we provide empirical evidence drawn from India.

Both feminist and evolutionary theories are in agreement that a pivotal aspect of gender relations is the need for men to control the sexuality of women. Feminist theory identifies patriarchy as the root cause of domestic violence, whereby males do whatever is needed to exercise control over women and keep them subservient [e.g. Dobash and Dobash (1979), Martin (1976), Yllo and Strauss (1990)]. Evolutionary theory has it that domestic violence ultimately stems from paternity uncertainty [e.g. Daly and Wilson (1993, 1996)]. Because the paternity of children was never certain in our evolutionary past, natural selection would have favoured proprietary behavior by males with regard to sexual access to their mates. Domestic violence, in this view, stems from the insecurity and jealousy that males feel when their partners are exposed to the possibility of sexual encounters with other males. Although feminist theory does not appeal to evolutionary arguments, it is nevertheless true that the latter can augment feminist claims by providing some evolutionary underpinnings for patriarchy.

We pursue two goals in this paper. First, we attempt empirically assess the feminist and evolutionary theories of domestic violence. While both theories often make similar predictions, it is possible to separate them out in some scenarios. For example, earning

by women would elicit similar predictions from both theories, but evolutionary theory would go further and predict that women whose earnings come from working *outside* the home would experience greater domestic violence. This is because, in the perception of their husbands, there is greater danger for these women may have sexual contact with other men and paternity uncertainty would trigger more spousal jealousy and violence as a response. This claim can be tested, and we do so in this paper. Furthermore, such violence can hurt the chances of survival of the fetus in pregnant women. So evolutionary theory gives the clear-cut prediction that pregnant women would be *less prone* to spousal violence than women who are not pregnant [Wilson and Daly (1993)]. Feminist theory, on the other hand, would be agnostic on this issue because it is unclear how patriarchal control might respond to pregnancy. This difference in prediction, too, can be tested with our data and we do so.

The second goal we pursue in this paper is to ascertain if domestic violence impinges on female autonomy. In feminist theory, domestic violence is an outcome that derives from the weak autonomy and bargaining power of women. This theory predicts that women who have more autonomy (perhaps because they earn independent incomes) would experience less mate violence than women with less autonomy. In a pioneering paper that brought out the importance of female autonomy in determining the demographics of India by region, Dyson and Moore (1982) showed a clear divide in the autonomy of women in north India and those in south India (with the latter exhibiting greater autonomy).¹ Therefore, one would expect less domestic violence in the south of India. As was shown by Menon and Johnson (2007) using the NFHS data for India, and as we confirm here, this is patently false: women from the south appear to be beaten more frequently. We are able to provide an explanation for this very puzzling fact. We show that there is no necessary relationship between a woman's outside options and the extent to which she is a victim of spousal abuse.

The framework that suggests itself when we seek to understand domestic violence is

¹But see Rahman and Rao(2004) for a contrary view.

that of household bargaining. Most bargaining models tend to assume that bargaining is a cooperative endeavor; that the outcome is Pareto efficient. But this is a difficult assumption to justify in the context of spousal violence.² We concur with the theoretical literature on domestic violence that this is best analyzed in a noncooperative framework, as is done in Tauchen, Witte, and Long (1991), Farmer and Tiefenthaler (1996), and Bloch and Rao (2002). Violence is a means to obtaining the upper hand in bargaining situations. In developing countries, there are hardly any legal recourses to domestic violence; even when the laws are on the books they will not be enforced if society finds such violence culturally acceptable. In the developed countries, where the laws are enforced with less reluctance, the enforcers are hampered by the fact that charges of domestic violence are often dropped by the victims.³

In their pioneering theoretical work on the economics of domestic violence, Tauchen, Witte, and Long (1991) assume that spousal violence is used to control behavior and is also a source of gratification for the abuser. They argue that an increase in the income of the abuser increases his violence and welfare, yielding no benefit to the victim if her reservation utility is binding. Increases in the victim's income generally increases her welfare. In high income families with women supplying most of the income, the authors argue that an increase in the victim's income may increase violence.⁴

Farmer and Tiefenthaler (1996) have argued that the laying of charges in domestic violence cases may be a signalling device. By communicating to their abusers that they have access to outside support and that they will leave should the violence continue, in effect they signal

²It is possible to suggest a view that outcomes can still be ex ante Pareto efficient by invoking the assumption that information is asymmetric and incidents entailing spousal violence are much like strikes observed in union-management negotiations. But such an interpretation seems to us to be strained and untenable.

³But the Farmer and Tiefenthaler (1996) underscores the point that too much must not be read into this. In their view, the placing of charges is a signalling device that curtails abuse. See the discussion below.

⁴But the authors acknowledge that the conditions under which this may happen are odd.

a higher threat utility. The authors propose this as the reason why women often drop the charges they brought against their abusers; the use of services offered to battered wives offers a credible signalling mechanism as much as it offers a direct reprieve from battering.

Goode (1971) was an early proponent of the view that, in the absence of other factors such as education or income that may confer power within a relationship, people may resort to violence as a substitute to achieve their ends. Using data from three villages in a southern Indian state, Rao (1998) showed that women who faced greater domestic violence had less control over resource allocation within the household. This, to our knowledge was the first paper to quantitatively establish a connection between domestic violence and decision-making power. Addressing the problem of dowry-related violence in India, Bloch and Rao (2002) propose a theoretical model of asymmetric information within a household bargaining framework. The husband uses violence to signal to his in-laws the degree of his satisfaction with his marriage and uses violence as a weapon of extortion. The authors show that women coming from wealthier families are more likely to be beaten in order to elicit greater transfers from their parents. They then provide some evidence for their theory using ethnographic data drawn from a southern Indian state.

In this paper, we provide a simple noncooperative model of spousal violence in general. In our view, which is complementary to those of the authors whose papers are summarized above, spousal violence is a means for enhancing bargaining power. While dowry-related violence is a peculiarity of south Asia, spousal abuse is a universal phenomenon present in most societies. So we espouse the view, in particular, that spousal violence is a means to ensuring that the victim (taken to be a woman) allocates resources more in line with the preferences of the abuser (taken to be her husband). This is in accordance with the views of evolutionary psychologists, who argue that spousal violence is a means men utilize to ensure that women behave in their (the men's) reproductive interests; dominating women

through violence facilitates the transmission of the genes of violent men.⁵ This behavior gets entrenched in male human nature—and this is the essence of the argument—because it is rewarded by the process of natural selection. The genesis of domestic violence may well lie in the advantages it conferred in our evolutionary past on such behavior, but in the contemporary context it is not just reproductive interest that is at stake. The important and more general point is that violence garners resources for its perpetrators.

In our model women’s autonomy, as captured by the extent to which she can implement her preferences in household resource allocation, is determined among other things by the amount of spousal abuse she endures. We demonstrate that an improvement in the wife’s threat utility would increase her autonomy in the noncooperative equilibrium but this may be accompanied by an increase, not decrease, of the spousal violence she experiences. Thus increases in women’s education levels, outside options, and the support groups available to them may incite more spousal violence. We also show that an increase in the husband’s threat utility may, in fact, lower the amount of violence he inflicts on his wife. We provide strong empirical support for these claims using the extensive National Family Health Survey data of India for the years 1998-99.⁶ This data set contains detailed socioeconomic information on a nation-wide sample of women and whether they were beaten by their husbands or by any family members (hers or his) and, if so, how frequently. The data set also provides some detailed information at the individual and household level.

After controlling for a whole host of factors, working women are seen to face greater spousal violence and those working away from home even more so. There appears to be clear evidence in favor of the evolutionary theory of domestic violence. With regard to how the autonomy of married women depends on domestic violence, there is of course a clear endogeneity issue here: greater female autonomy would impinge on domestical violence, and

⁵See, for example, Wilson and Daly (1993, 1996) for an account of this line of argument.

⁶Some of our empirical results are similar to those of Menon and Johnson (2004).

domestic violence may in turn affect female autonomy—an issue that has been overlooked in the literature [e.g. Menon and Johnson (2007)]. We purge the former effect by suitable choice of instruments. Though there are some regional variations in the importance of certain factors in exacerbating domestic violence, the broad thrust of our results is unambiguous: domestic violence undermines women’s autonomy. This offers persuasive evidence in favor of our model and that of Bloch and Rao (2002): domestic violence is a vehicle employed by males to enhance their bargaining power. It is not necessary to invoke additional assumptions on preferences (such as men obtain satisfaction from spousal abuse, etc.) to explain the prevalence of domestic violence.

This paper is organized as follows. The next section presents our model and we derive some testable implications from it. In Section 3, we describe the data and present our sample statistics. Our econometric results are presented in Section 4. We present our concluding thoughts in Section 5.

2 The Model

In this section, we propose a model that determines a married woman’s autonomy endogenously when spousal violence is an option available to her husband.

We presume that the household consumes two goods, X and Y . For simplicity, we assume that these are household public goods so that we do not have to separately determine the private consumptions of individuals. Denote the utility function of the wife by $U_W(x, y, v)$, where x and y denote the respective amounts of X and Y consumed and v denotes the amount of violence inflicted by the husband on her. We assume that $U_W(., ., .)$ is increasing and strictly quasiconcave concave in its first two arguments and decreasing and strictly concave in the last. We denote the husband’s utility function by $U_H(x, y, v)$, with monotonicity and curvature properties identical to those of the wife’s utility function. In particular, we

posit that the husband’s utility also decreases with the amount of violence he inflicts on his wife because this leads to strained relations, loss of intimacy and trust, etc. This loss is the opportunity cost he perceives to engaging in spousal violence. In this view, domestic violence is a means to an end for the husband and not an end in itself.

We presume that the wife’s preferences over goods X and Y are different from those of the husband, and this difference is the point of contention within the household that makes bargaining power relevant. In South Asian households the wife manages the running of the household and, since we use data from India in our empirical work, we presume that she oversees the allocation of household resources. It is to bring this allocation more in alignment with his own preferences that the husband potentially engages in domestic violence. Indeed, one may interpret the efforts of patriarchy in exercising control over women as attempts to bring women’s behavior more in accord with the interests of males. Here we take household management (resource allocation) as the nexus of women’s struggle for autonomy.

For tractability, we assume that the wife’s utility function is of the form:

$$U_W(x, y, v) = \alpha_1 \ln x + \beta_1 \ln y - \delta_1 v, \quad \alpha_1 > 0, \beta_1 > 0, \alpha_1 + \beta_1 = 1; \delta_1 > 0, \quad (1)$$

and the husband’s of the form:

$$U_H(x, y, v) = \alpha_2 \ln x + \beta_2 \ln y - \delta_2 v, \quad \alpha_2 > 0, \beta_2 > 0, \alpha_2 + \beta_2 = 1; \delta_2 > 0. \quad (2)$$

To ensure that difference in preferences over goods is a point of contention for the couple, we assume that $\alpha_1 \neq \alpha_2$. The normalizations $\alpha_1 + \beta_1 = 1$ and $\alpha_2 + \beta_2 = 1$ are innocuous and are invoked for convenience.

Let \bar{U}_W and \bar{U}_H , respectively, denote the wife’s and husband’s threat utilities, that is, these are their utilities when bargaining breaks down between them and they manage their affairs independently. In the South Asian context, divorce is largely out of the question—especially in rural areas—and non-cooperative behavior within marriage is the likely threat

scenario [see Woolley (1988), Chen and Woolley (2001), Lundberg and Pollak (1993)]. Suppose the family income, taken as exogenous here, is M and that the units of goods X and Y are chosen so that their prices are both normalized to unity. We assume that the husband and wife pool their incomes.

The wife is viewed here as the one who manages the household income and implements the allocation of resources. To what extent this allocation reflects her own preferences will depend, of course, on her bargaining power. In the allocation of resources, suppose the wife puts a weight γ ($0 \leq \gamma \leq 1$) on her own preferences and $1 - \gamma$ on her husband's. We can interpret γ as the wife's autonomy (or as her bargaining power) and is one of the principal endogenous variables of interest here.

To begin with, let us consider how female autonomy is determined in the absence of the threat of domestic violence. Suppose in this case that γ_0 and $1 - \gamma_0$, respectively, are the weights the wife would put on her own preferences and on her husband's. We would expect that $\gamma_0 < 1$ because an allocation of resources tilted too much in favor of her own preferences is likely to generate a utility for her husband that falls short of his threat utility. The wife has to ensure that her husband's utility in the allocation she chooses is at least equal to his threat utility, \bar{U}_H . In other words, γ_0 and the associated allocation $(x_0, y_0,)$ of the two goods must be the solution to the problem:

$$\max_{x,y,\gamma} \quad \gamma U_W(x, y, 0) + (1 - \gamma)U_H(x, y, 0) \quad s.t. \quad x + y \leq M, \quad U_H(x, y, 0) \geq \bar{U}_H. \quad (3)$$

If the husband's threat utility is very high, one might expect γ_0 to be close to 0. At the other extreme, if the husband's threat utility is very low, the wife may well choose $\gamma_0 = 1$. It is possible that the husband reckons the allocation of household resources in this scenario is not sufficiently aligned with his preferences. In other words, he might deem that γ_0 is too high. To reduce his wife's exercise of independence and thereby bring the resource allocation more in line with his own preferences, he may choose the option of wife battering. As outlined

in the Introduction, evolutionary psychologists argue that spousal violence is a means to force women to serve the *reproductive* interests of men [see, for example, Wilson and Daly (1993, 1996)]. But the use of spousal violence can be more general, and that is the view we adopt here. Our approach is consistent with Rao (1998), who found using data from three villages in the state of Karnataka, India, that domestic violence and intra-household allocation of resources were correlated, and also with that of Goode (1971).

The determination of female autonomy as we model it involves two stages. In the first stage, the husband sets down the rule by which he decides how much violence he will inflict on his wife. We explicitly allow for the possibility that the exercise of autonomy by the wife may incite violence by the husband. Suppose the husband commits to an intensity of battering, b , which inflicts violence on his wife in proportion to the autonomy she exercises, that is, the violence, v , that she suffers is given by $v = \gamma b$. In the second stage, the wife decides how much weight to put on her own preferences (that is, how much autonomy to exercise) in the household resource allocation.

Since the choices outlined above are made sequentially, we need to work backwards to solve for the equilibrium. Given that the violence she confronts is $v = \gamma b$, in the second stage the wife solves

$$\max_{x,y,\gamma} \quad \gamma U_W(x,y,\gamma b) + (1-\gamma)U_H(x,y,\gamma b) \quad s.t. \quad x+y \leq M, \quad U_H(x,y,\gamma b) \geq \bar{U}_H. \quad (4)$$

In solving this problem, the wife makes her choices with full awareness of the battering this may subsequently entail. Denote the solution to this problem by $[x^*(b), y^*(b), \gamma^*(b)]$. (For brevity, we suppress the dependence of this solution on the husband's threat utility.) The husband's utility in this solution, $U_H(x^*(b), y^*(b), \gamma^*(b)b)$, will be at least as large as $U_H(x_0, y_0, 0)$, which is the utility in his absence of wife battering.

It is readily verified that the degree of autonomy, $\gamma^*(b)$, the wife chooses to exercise in

the second stage is strictly declining in b :

$$\frac{d\gamma^*(b)}{db} < 0, \quad (5)$$

that is, the greater the intensity of battering, the lower is the autonomy the wife exercises.

The husband is cognizant of his wife's optimal response to the potential spousal violence she faces. Therefore, in the first stage, in choosing the intensity of battering, b , the husband solves

$$\max_b U_H(x^*(b), y^*(b), \gamma^*(b)b) \quad s.t. \quad U_W(x^*(b), y^*(b), \gamma^*(b)b) \geq \bar{U}_W. \quad (6)$$

Denote the solution to this problem by b^\dagger . The wife's endogenous autonomy in the presence of domestic violence, then, is given by $\gamma^*(b^\dagger)$. The amount of spousal violence, v^\dagger , she encounters in the (subgame perfect Nash) equilibrium is given by $v^\dagger = \gamma^*(b^\dagger)b^\dagger$. In general, the endogenous bargaining power of the wife and the equilibrium level of spousal violence will depend on the threat utilities.

It must be noted that wife-beating is not inevitable in this model. For one, if the wife's threat utility is very high, naturally enough, the husband may not exercise the option of spousal violence. Even if he could inflict violence, he may choose not to do so: if the marginal utility cost to the husband of lowering his wife's autonomy exceeds the marginal benefit, it may well be that $b^\dagger = 0$. This is a more likely event when the husband's threat utility is quite high, as we shall see.

It is easy to see that, generally, the equilibrium intensity of wife battering b^\dagger will be weakly declining in the wife's threat utility. This can be seen from the upper and lower panels of Figure 1. On the horizontal axis of both panels is the intensity of wife battering, b . On the vertical axis of the upper panel is the husband's utility after the wife optimally chooses the autonomy she exercises, given b . The husband's utility (shown as $ABCD$) is U-shaped as a function of b ; for low levels of b , his utility is increasing because increases in wife battering

induce her to align the household's resource allocation more in accord with his preferences. But at higher levels of b , the marginal utility cost to him of inflicting violence on his partner overwhelms the additional benefit. The wife's utility (shown as LM in the lower panel), on the other hand, monotonically declines in b . This is because the increasing violence she faces for exercising autonomy induces her to choose resource allocations that increasingly deviate from her preferences. Both the curves ABC and LM have been drawn without the consideration of the fact that the husband's utility can not be lower than its threat value, \bar{U}_H , shown as OE on the vertical axis of the upper panel. So, even if $b = 0$, the wife will curtail her bargaining power so that her husband's utility achieves the level indicated by OE instead of OA ; as a result, her own utility falls from OL to ON on the vertical axis of the lower panel. For values of b in the range $0 < b \leq \underline{b}$, the husband has no use for wife battering and so he will either set $b = 0$ or set b at a level that exceeds \underline{b} . Thus wife battering is ruled out over the range $0 < b \leq \underline{b}$. From the lower panel of the Figure we see that the wife's utility jumps discontinuously from ON to OR when the husband starts battering just past $b = \underline{b}$.

From the upper panel of Figure 1 we see that the battering intensity that is globally optimal from the husband's point of view is b^* . Whether this is feasible or not depends on the wife's threat utility, \bar{U}_W . If this threat utility is equal to or lower than OS in the lower panel, the husband would choose to batter with an intensity b^* . This optimum is clearly independent of the husband's threat utility, \bar{U}_H . If the wife's threat utility rises to a level above OS in the lower panel her threat utility will be binding, and the husband is constrained to set $b^\dagger < b^*$; he will set b^\dagger as the largest value of b for which his wife will receive her threat utility, \bar{U}_W . When \bar{U}_W increases, b^\dagger will have to decrease commensurately. Thus for threat utilities of the wife within the range $OS < \bar{U}_W \leq OR$ on the vertical axis of the lower panel, the equilibrium battering intensity, b^\dagger , will be declining in \bar{U}_W . Over the range

$OR < \bar{U}_W \leq ON$, wife battering is infeasible because even the minimal battering (that is, b) the husband deems to be in his self-interest pushes the wife below her threat utility. For $\bar{U}_W > ON$, the marriage is infeasible even in the absence of wife battering because there is not enough surplus in the marital alliance to allow both partners to recover their threat utilities.

The above reasoning, along with the comparative static derivative in (5), shows that the relationship between the wife's threat utility and her autonomy in equilibrium, $\gamma(b^\dagger)$, is of the form shown in Figure 2. It is weakly increasing in her threat utility and discontinuously increases when her threat utility reaches OR , at which point wife battering becomes infeasible.

It is very interesting to inquire how the equilibrium level of spousal violence the wife suffers changes with her threat utility, \bar{U}_W . This equilibrium level of violence is given by $v^\dagger = \gamma^*(b^\dagger)b^\dagger$. When \bar{U}_W increases, we have seen above that, when the wife's threat utility binds in the equilibrium, b^\dagger decreases and so, in view of the comparative static derivative in (5), $\gamma^*(b^\dagger)$ will increase. What happens to the equilibrium level of violence depends on how sensitive the wife's exercise of autonomy is to battering intensity. If the absolute value of the elasticity of $\gamma^*(b)$ with respect to b is greater than unity, an increase in the wife's threat utility may result in *greater*, not less, violence in equilibrium.⁷ In Figure 3, we plot the amount of domestic violence, $v = \gamma^*(b)b$, as a function of battering intensity, b , for the assumed functional form (1) for the wife's utility function. We see that the relationship is an inverted-U curve, displayed as EFG in Figure 3. Suppose the wife's threat utility is binding in equilibrium. The husband implements the equilibrium value $b^\dagger = OH$ and the associated level of spousal violence the wife suffers is GH . We have seen that, when her threat utility increases, b^\dagger decreases. Over the range $OI < b^\dagger < OH$, where the elasticity

⁷If this elasticity is denoted by $\epsilon(b)$, we readily see that $dv^\dagger/d\bar{U}_W = [1 + \epsilon(b^\dagger)]\gamma^*(b^\dagger)db^\dagger/d\bar{U}_W$. Since the derivative on the right hand side is non-positive (from the negative slope of the schedule in the lower panel of Figure 1), the result follows.

condition referred to above is satisfied, we see from the Figure that the equilibrium level of violence increases when the wife's threat utility rises. Further increases in her threat utility, which push b^\dagger below OI , result in decreases in the equilibrium violence. At a sufficiently high \bar{U}_W we shall observe $b^\dagger = OJ$, the minimal battering intensity ($= \underline{b}$) the husband would ever find worthwhile to engage in wife-battering. At higher levels of \bar{U}_W , b^\dagger discontinuously falls to zero; the equilibrium level of violence, therefore, discontinuously falls from EJ in the Figure to zero.

The reasoning above demonstrates that, contrary to intuitive ideas one may entertain, an increase in the attractiveness of the outside options available to women need not be accompanied by an endogenous monotonic decline in wife beating. When the wife's threat utility is very low, the mere threat of violence may be sufficient to undermine her autonomy. When the battering intensity declines in response to higher threat utilities, however, she may find it worthwhile to indulge her preferences so much that the incidence of domestic violence actually increases in equilibrium. Thus, for example, if higher earnings of the wife indicate higher threat utility (as is reasonable), our model predicts that there may be *positive correlation* between women's earnings and the extent of spousal violence they endure in equilibrium. We record this insight for subsequent reference as the following proposition:

Proposition 1 : *The equilibrium level of spousal violence a woman endures may be non-monotonic in her threat utility.*

We now inquire how the wife's bargaining power depends on her husband's threat utility, \bar{U}_H . Suppose the wife's threat utility is fixed at a level in the range $OS < \bar{U}_W \leq OR$ shown in the lower panel of Figure 1. We have seen that the equilibrium battering intensity is then given by $b^\dagger < b^*$. When his threat utility is very low, the husband has a great deal to gain by engaging in spousal violence. As his threat utility increases, all else constant, his wife's utility will decline even in the absence of wife battering because she has to ensure that her

husband receives his threat utility. As long as her utility in the absence of wife battering (that is, ON in the lower panel of the Figure) is sufficiently high that $OR > \bar{U}_W$, when his threat utility increases the husband will find it optimal to continue enforcing the same level of battering intensity as before. When his threat utility continues to increase, the distance OR will decrease and a point will be reached when $OR = \bar{U}_W$. At that point, wife battering ceases to be feasible and, as we have seen, the husband discontinuously sets $b^\dagger = 0$.

The wife's bargaining power in equilibrium as a function of her husband's threat utility will be as shown in Figure 4. Suppose that her threat utility lies within the range $OS < \bar{U}_W < OR$, that is, her threat utility is binding in equilibrium. When the husband's threat utility is low (below OW in Figure 4), he will maximize his utility by opting to enforce a battering intensity $b^\dagger < b^*$. As his threat utility increases over the range O to OW , he will opt for the same level of wife battering intensity. When his threat utility reaches OW , the minimal amount of battering he would find worthwhile would reduce his wife's threat utility. In terms of Figure 1, OR coincides with \bar{U}_W . At this point battering is unviable and the wife's bargaining power discretely increases, as shown in Figure 4. For the husband's threat utilities in the range $OW < \bar{U}_H \leq OV$ in the Figure, wife battering is entirely out of the question and her bargaining power stays constant. For $\bar{U}_H > OV$, there is not enough surplus in the marriage to ensure that both partners receive their threat utilities. For \bar{U}_H in the range 0 to OW , the wife is held at her threat utility. When \bar{U}_H is between OW and OV , the wife achieves a utility level *above* \bar{U}_W , since the minimal level of wife battering the husband would find profitable would push her below her threat point and is therefore not feasible.

We see from Figure 4 that the wife's bargaining power is weakly *increasing* in the husband's threat utility. Contrary to what we would expect from standard bargaining models, the wife's equilibrium utility here can increase when her husband's threat utility increases.

When \bar{U}_H is sufficiently high, the resource allocation within the household is already strongly aligned with his preferences even in the absence of spousal violence. Since he perceives an opportunity cost to wife battering, he reckons it is not worth incurring the cost of further narrowing the gap between his preferences and the outcome his wife voluntarily implements. We record these points for subsequent reference:

Proposition 2 : (a) *The wife's autonomy in equilibrium is non-decreasing in her husband's threat utility.* (b) *The extent of spousal violence the husband perpetrates in equilibrium may decline in his threat utility.*

In our model, as \bar{U}_H increases the husband suddenly relinquishes spousal violence and the wife's utility discretely jumps up from her threat utility. One can readily conceive of other models that would deliver this outcome more gradually. The important point, however, is that when the husband's threat utility is low he maintains his wife at her threat utility through spousal violence. It is when the *husband's* threat utility is sufficiently high that the wife's well-being strictly exceeds her threat utility. This model also predicts that, all else held constant, domestic violence can be expected to *decline* when the husband's threat utility increases. It is only husbands with poor outside options who will resort to spousal violence.

The analysis above enables us to predict the effects on domestic violence of various exogenous determinants. Naturally, the higher is the wife's education, dowry, earnings, and land ownership the higher would her threat utility be and, therefore, the higher her autonomy. Equilibrium spousal violence, however, is not necessarily monotonic in these factors, as we have seen. Furthermore, increases in the husband's threat utility due to analogous factors may well decrease the spousal violence.

One exogenous component of the environment that would be expected to substantially impinge on a woman's autonomy is the sort of family she lives in after marriage. If she lives in a nuclear family, her autonomy would be greater than when she lives with the husband's

extended family, which usually includes his parents, his brothers and their sisters and wives [see Dyson and Moore (1983)]. In the latter scenario, one would expect the husband’s threat utility to be higher than when the family is nuclear. The reason is that, in the event of a breakdown of bargaining between him and his wife, the support of his parents and siblings would prop up his threat utility. This increase in his threat utility in going from a nuclear to an extended family may result in a *decline* in spousal violence, as argued above.

Another factor that would be expected to impinge on spousal violence is the number and sex of the wife’s siblings. If she has unmarried sisters, one would expect her threat utility to decline. This is because her parents would be unwilling to assume responsibility for her wellbeing when they have unmarried daughters to take care of. On the other hand, if she has brothers it is likely to bolster her threat options. They could not only confront her husband if he engages in excessive spousal violence towards their sister but may also be willing, if grudgingly, to take care of her in the event her marriage runs into difficulties. For both these reasons, one would expect that women with brothers would encounter less spousal violence. For similar reasons, one would expect the same outcome when the couple resides with the wife’s natal family. This is a frequent occurrence in the southern Indian state of Kerala, where a significant fraction of the population is organized along matriarchal lines—in sharp contrast to the rest of India, which is highly patriarchal.

3 Data and Estimation Strategy

We use the National Family Health Surveys (NFHS-2) data collected in 1998-99.⁸ The cross-sectional data was collected via a multi-stage sample design. The survey is nationally

⁸The NFHS-2 survey was funded by the United States Agency for International Development (USAID) and UNICEF. The survey is the outcome of the collaborative efforts of many organizations: The International Institute for Population Sciences (IIPS), Government of India, New Delhi, Thirteen reputed state field organizations, ORC Macro, Calverton, Maryland, USA, and the East-West Center, Honolulu, Hawaii, USA.

representative and collected information from 91,196 households in 25 states and interviewed over 90,000 eligible women, ever-married women between the ages of 15-49, in these households. The survey had an excellent response rate, ranging from 89 percent to 100 percent, and in 24/26 states it was above 94 percent.⁹ The survey provides state-level estimates of demographic and health parameters as well as data on various socioeconomic and programmatic information at the village, household and individual level. We narrow down our study to eligible women living in rural areas who are currently married. The sub-sample comprises of over 50,000 eligible women.

The NFHS-2 survey covered a number of new topics on gender issues relevant to this study, such as information on women's autonomy, domestic violence and nutrition. The survey also collected anthropometric measures like woman's height and weight (these were carried out on site at the time of the interview).

Outcome Variables

We use nine dichotomous outcome variables in our econometric study. We consider eight principal autonomy outcome variables. These reflect women's participation in household decision-making, her need to take permission to visit market, family of friends. We also consider one domestic violence variable: violence perpetuated by her husband.

- Physical violence: whether the husband physically assaulted his wife during the year preceding the survey. Women are grouped as those not beaten by husbands in the 12 months preceding the survey and those who were beaten.
- Autonomy: Woman is involved, self or jointly with her husband or other members of the family, in the decision - "what items to cook?"
- Autonomy: Woman is involved, self or jointly with her husband or other members of

⁹International Institute for Population Sciences (IIPS) and ORC Macro. 2000. National Family Health Survey (NFHS-2), 1998-99: India. Mumbai: IIPS.

the family, in the decision to obtain health care for herself.

- Autonomy: Woman is involved, self or jointly with her husband or other members of the family, in the decision to purchase jewelry.
- Autonomy: Woman is involved, self or jointly, in the decision to go and stay with family or siblings.
- Autonomy: Woman is involved, self or jointly with her husband or other members of the family, in deciding how to spend money.
- Autonomy: Woman does not need permission to go to the market.
- Autonomy: Woman does not need permission to visit family.
- Autonomy: Woman is allowed to set money aside for herself.

As Table 1 shows a large proportion of the sample reports some form of subservience, as indicated by incidence of domestic violence, exclusion from family decisions, or needing permission to go to the market or visit family and friends. Roughly 18 percent of women in our sample of 58,500 have been beaten by their husbands, and at least 10 percent experienced such violence in the 12 months preceding the survey. There are substantial variations across women's autonomy variables. Overall in rural India, 95 percent of women are involved in decision-making (or don't need permission) on at least one of the eight selected topics.¹⁰ Around 50 percent are involved in the decision to access health care for themselves, 52 percent are involved in decisions to purchase jewelry. However, a large number of women (around 80 percent) still need permission to go to the market or visit family and friends. The survey asked two questions about woman's control over money: one, if she was allowed to have money set aside (for herself), and the other, if she was involved in the allocation

¹⁰We created a variable Decision which takes the value of 1 if woman participates in any of the decisions and 0 otherwise. This variable has mean 0.95 and standard deviation 0.214.

of household money (Question: who decides how to spend money?). It is interesting that though 55 percent of women are allowed to have money set aside only 15 percent are involved in the decisions to spend the household money. The ‘owning’ of money apparently does not necessarily imply the freedom to dispose of it.

Predictor Variables

The survey also collected detailed economic and demographic data at the individual and household level. For our analysis we consider the following variables at the individual level: woman’s and husband’s educational attainment, length of their marriage, woman’s age at her first marriage, woman’s employment status, and aspects of woman’s work (employed by family, someone else, or self). From the question about woman’s ideal number of sons and information on total number of sons, we constructed the variable ‘Un-met desire for sons’. In India where a woman is considered responsible for the gender of the child, and where families prefer sons over daughters, a woman might face more domestic violence and have less autonomy if there is an un-met desire for sons. In the social network module, the survey asked the woman if she discussed family planning with her mother and whether she went to her mother’s house for delivery, as is the custom in most Indian households. We used this information to generate the variable mother’s support.¹¹ We expect that a woman might ask for more autonomy and would be less tolerant of physical abuse if she has support from her family. This variable might suffer from endogeneity issues, a woman might contact her mother more frequently in case she needs to vent her anger or frustration with abuse or lack of autonomy. There can also be another reason for the association between domestic violence and mother’s support, namely, the husband might exert more control if he believes she is influenced by outsiders, in this case her mother.

The survey also collected anthropometric measures like woman’s height and weight; these were measured on site at the time of the interview by the surveyors. In order to create these

¹¹These questions were asked only for the last two children.

variables we first calculate the average weight and height for each state, and then for each woman we calculate the deviation from the mean for the state that she belongs to. We use these as instrumental variables for domestic violence perpetrated by her husband. We will discuss these variables in more detail later in the paper. The ideal variables would be the difference in weight and height between husband and wife, but the survey did not collect this data for the husband.

At the household level we consider the following variables: caste, religion, an asset based standard of living index, and structure of the household. For the variable caste we consider four groups: scheduled caste (a group that is socially segregated), scheduled tribe (a group identified on the basis of physical isolation), and other backward classes (officially identified as socially and educationally backward), and the upper caste (comprising Brahmins and other higher castes that are privileged). We consider 4 major religious groups, Hindus, Muslims, Sikhs and Christians. The survey asked multitude of questions about ownership of assets like a car, television, property etc. NFHS used ownership of assets to create a standard of living index with three categories: low, middle and high. For the variable structure of the household we created 3 groups: nuclear family (defined as a couple with/without children), joint family living with woman's in-laws, and joint family living with woman's natal family. We created these using information about woman's relationship with the household head and other members in the household.

In Table 2 we list the summary statistics of these individual and household predictor variables. We consider five educational categories: illiterate, literate but less than primary school, primary school completed, middle school completed, high school completed or higher. The sub-sample of rural population has extremely low levels of education and literacy rates, with women far less educated than the husbands; an astounding 59 percent of the women are illiterate where as only 31 percent of the husbands are illiterate in our sub-sample; 25

percent of men have completed high school or more as compared to 9 percent of women. The mean age of first marriage is 16.9 years for the woman, and an average length of marriage is 14 years. Only 7 percent of women in the sample have some support from their mother, and 40 percent of women still have an un-met desire for sons. On the work front, 41 percent of women are currently working or have worked in the last 12 months, 19 percent work for family members, 4.5 percent are self employed and roughly 18 percent are employed by someone else.

In the sample approximately 80 percent of women belong to Hindu households, 11 percent to Muslim households, 5 percent to Christian households and 2.4 percent to Sikh households.¹² Around 18 percent of the women belong to scheduled caste, 15 percent to scheduled tribes, 31 percent belong to other backward classes, and the rest to upper castes. For the standard of living index, around 35 percent of women belong to the group with the lowest standard of living index, 50 percent belong to the middle group and 15 percent to the highest group. A large proportion (59 percent) of the women live with their husbands in a nuclear family and 40 percent of women (couples) live in a joint family, 38 percent with in-laws (husband's family) and only 2 percent with her own parents.

Estimation Strategy

To assess the impact of domestic violence on the autonomy outcomes, we use an index of the woman's weight and height (WH) as instrumental variables (IV) for domestic violence. Our reason for using WH as the instrument variable for domestic violence is that a husband is less likely to indulge in physical abuse if he feels he can physically overpower his wife. A stronger woman will be more able to fight back, thus reducing the probability of future violence. Of course, there are a lot of other factors that might make even a physically strong woman acquiesce to spousal violence—like absence of other options or a belief system that makes her accept wife beating as legitimate. We still maintain that woman's physical

¹²The survey asked the following question: "What is the religion of the head of the household?".

strength does play an important role in determining domestic violence, and find empirical support from our sample. In order to identify the following model, WH and domestic violence should be highly correlated.¹³ Table 3 reports the pairwise correlation coefficients between the variables, and the significance level of each correlation coefficient. Both weight and height index are significantly correlated (at 5 percent) with the domestic violence variable.

There are two major issues that we can think of with the use of weight and height as instruments. The first is the potential existence of third factors influencing both WH as well as autonomy outcomes. In order to identify an IV model, the exclusion restriction requires that the relationship between weight-height and autonomy outcomes be completely mediated by physical violence. We believe that a woman's income would be the only other avenue of influence. Previous literature has found that women's income (especially control over income) to be positively correlated to their autonomy [e.g. Kantor (2003), Anderson and Eswaran (2007)]. It is possible that a low income may undermine a woman's power to allocate food between family members and this can lead to a lower weight for the woman. We control for income level by including a standard of living index (SLI). We think that physical violence is a major route through which the weight and height of a woman influences autonomy outcomes. The other concern is that of selection bias, a man who intends to intimidate his wife with physical violence is more likely to marry a woman of smaller physical frame. However, in rural India most of the marriages are arranged by the either the parents or other family elders or village elders. In most of these cases, the man and woman do not see each other before and sometimes even during marriage.¹⁴

We estimate the following two-stage least square model,¹⁵ where D is the variable mea-

¹³Identification also requires the variance in WH to be independent of other factors determining women's autonomy, controlling for observable measures.

¹⁴There might be the possibility that the family members choose a woman of a smaller frame for their son, so that she is easily intimidated by their son.

¹⁵we re regress domestic violece on all the predictor variables and height and weight index. We then use the

suring decision-making autonomy, which takes the value of 1 if a woman has autonomy and 0 otherwise, as explained in 3

$$D = \alpha_1 X + \alpha_2 \widehat{V} + \epsilon_1 \quad (7)$$

$$V = \beta_1 X + \beta_2 WH + \epsilon_2$$

In the first stage regression: V is domestic violence as reported by the respondent, and WH denotes the indexes for the woman's weight and height, which are the instruments used to identify the first-stage regression. We regress domestic violence on all the predictor variables and WH . We then use the predicted values of this regression as the IV in the second stage ordinary least square regression of the autonomy variables.

The vector X contains regressors that determine the threat utilities of the woman and her husband, and we include the variables listed in Table 2. We expect education (both for man and woman) to have a negative impact on domestic violence and a positive impact on women's autonomy outcomes. Higher social economic status, and consequently less financial stress, should reduce the likelihood of domestic violence. Woman's age at first marriage should decrease domestic violence and increase autonomy; a young girl is easier to intimidate and, as the saying goes, easier to mold into a family's norm and tradition. We expect a woman to have less autonomy in a joint family than in a nuclear family. Working should increase a woman's bargaining power thus we expect a positive correlation with autonomy outcomes. However, working might or might not reduce the physical abuse she faces. We saw that the theory suggested that better outside options for the woman may increase wife beating. The husband might use violence to undermine a woman's bargaining power or her higher status as a working member. In India, where a woman is considered (erroneously) to be responsible for the gender of children and where families prefer sons over daughters, a woman might face more domestic violence and have less autonomy if there is an un-met predicted values of this regression as the IV in the OLS regression of the Autonomy variables.

desire for sons. Given the desire for more boys we expect un-met desire for sons to increase physical abuse and reduce women’s autonomy. As discussed earlier, however, support from mother is riddled with some endogeneity bias and we hope to find a better instrument for this. We also include dummy indicators for the 26 states.

4 Results

In Table 4 we list the results from the first stage ordinary least square estimation. Column 2 reports the results for an ordinary least square regression and column 3 reports odds ratio from a logit estimation.

As others have found, education (both for man and woman) significantly decreases the incidence of domestic violence. We find this relation to be non-linear, and it is significant only if the woman and her husband have at least completed primary school or more. A literate woman with less than primary schooling is as likely to be beaten by her husband as an illiterate woman. Similarly, a literate husband who has some primary schooling is as likely to indulge in domestic violence as an illiterate husband.¹⁶ The odds of violence decreases as woman’s length of marriage increased or she was older at her first marriage. We find no evidence of a relation between domestic violence and un-met desire for sons or pregnancy status. We find a significant positive relation between support from mother and domestic violence. Women belonging to Sikh and Muslim households have significantly higher odds of domestic violence (1.35 and 1.18 respectively) as compared to Hindu household. In contrast, women belonging to groups with medium and higher SLI have significantly lower odds of domestic violence, as compared to the group with the lowest SLI .

¹⁶Also, the incidence of violence decreases significantly as level of education increases. For example, compared to a woman who has completed middle school, a woman who has completed high school and above is significantly less likely to be beaten by her husband (coefficient is larger).

Consistent with our theory, domestic violence is positively related to work status of a woman and varies across her work status. The coefficients on all the categories of work status are significant in the two estimated equations. However, women who work for someone else are more likely to face domestic violence (OR 1.43) than those that work for a family member (OR 1.3). We also find that the incidence of domestic violence is significantly lower in couples that reside in joint families (OR 0.71). This finding, which Menon and Johnson (2007) also find, is consistent with our theory. When the couple resides with the husband's family, his threat utility increases. As a result, the wife's equilibrium autonomy declines and there is less need for the husband to resort to violence to boost his own well-being.

In Tables 5, 6 and 7 we report the results from the second stage, of the two stage least squares estimation. As we predict in our model, domestic violence significantly impinges on woman's autonomy. Women that are beaten by their husbands have significantly less autonomy in almost all aspects of their lives as captured by the seven autonomy indicators, for which the coefficient are quite large and statistically significant. A woman whose husband does not indulge in violence has significantly more control over the decisions in her life like accessing health care for herself, buying jewelry and staying with her family. Also, she is less likely to need permission to go the market, and is able to set money aside for herself. The only exception is her participation in the decision to spend money, although the coefficient for domestic violence is negative, it is not significant (Table 7).

Higher education increases threat utilities for both woman and her husband. Where as, higher level of education would increase woman's autonomy, her husband's educational attainment would reduce her bargaining power. Surprisingly, for most of the autonomy indicators, the coefficients on woman's educational attainment are significant only for the 'high school and above' category, and not for lower levels of education; nevertheless, they are of the right sign (negative). This is true also for husband's educational attainments; if a

husband has at least high school degrees it reduces woman's autonomy, although only with respect to decisions about staying with her family, buying jewelry and cooking. Surprisingly, husband's educational attainments do not influence woman's autonomy with respect to money matters or needing permission to go to the market or other visits.

In line with the predictions from our theoretical model women that work have significantly more bargaining power, and this is true for all autonomy indicators that we consider in our second stage estimation. Working increases a woman's threat utility and in turn strengthens her decision making power in the household; woman has more control over money, is involved in decisions to access health care, purchase jewelry, stay with family, or cook, and is less likely to need permission to leave home.

Another variable that increases the husband's threat utility and would impinge on a woman's autonomy is if the couple lives in a joint family (stays with husband's family); as expected, this reduces woman's power in all aspects of autonomy, from her decision about what to cook to her needing permission to go to the market. In essence, a woman is more restrained if she is living with her husband's parents or siblings rather than just with her husband in a nuclear family. The joint family structure has clear specification of a woman's role and, in addition, other family members are able to monitor and control a woman's life more closely.

In general, the length of marriage significantly increases woman's autonomy (significant for 6 out of the 8 autonomy indicators). Similarly, woman's age at first marriage also increases woman's bargaining power, however, it is significant only for three autonomy indicators: decision to access health care, decision to spend money and not needing permission to go to the market. Despite our expectations about positive influence of bearing sons, we find no significant relation between unit desire for sons and women's autonomy outcomes. It might be that woman's desire for more sons does not reflect or truly capture the husband's or his

family's desire for more sons. In our data we have a large proportion of women who, despite having more than 3 sons, still feel the need for more sons. It might be that these families are content with the woman's ability to bear a son and do not penalize her.¹⁷ We also don't find mother's support and the woman being currently pregnant to be significant determinants of women's autonomy.

With the exception of 'decision to spend money' (women from Muslim and Christian households have more autonomy), we do not find any difference in women's autonomy across different religious households. Interestingly, women belonging to the socially segregated group, the Scheduled Caste, have more control over decisions in their lives. They are less likely to need permission to stay with their natal family, to buy jewelry, to set money aside for themselves, to the market or to visit family. Women belonging to scheduled tribes (known to be physically isolated group) are less likely to need permission to leave home, which is not surprising given that most of the women have to travel to get the basic necessities like water for the family. Yet these women are no different from the other groups in terms of other measures of autonomy.¹⁸ We observe a negative relation between women's autonomy and the standard of living index (SLI). Women belonging to more affluent families have less bargaining power than those belonging to poorer families (as measured by SLI), in five out of the eight autonomy outcomes. It is possible that more affluent families are more particular about their so-called 'family honor', which is invariably tied to controlling women's actions and mobility. So, paradoxically, the autonomy of women in well-off families may be lower than that of women in poorer families.

¹⁷However, we do not find other variables like proportion of boys or given birth to a son to be a significant determinant of autonomy. We are quite surprised by this. Once we carry out these regressions for different regions in India, all these variables are significantly positive, and un-met desire for sons turns out to be significantly negative for the northern region (region with the lowest girls to boys ratios)

¹⁸We should be skeptical about using these measures (require permission to leave home) as capturing women's autonomy for physically isolated groups for which the concept of a stationary home is missing.

5 Conclusions [To be Added]

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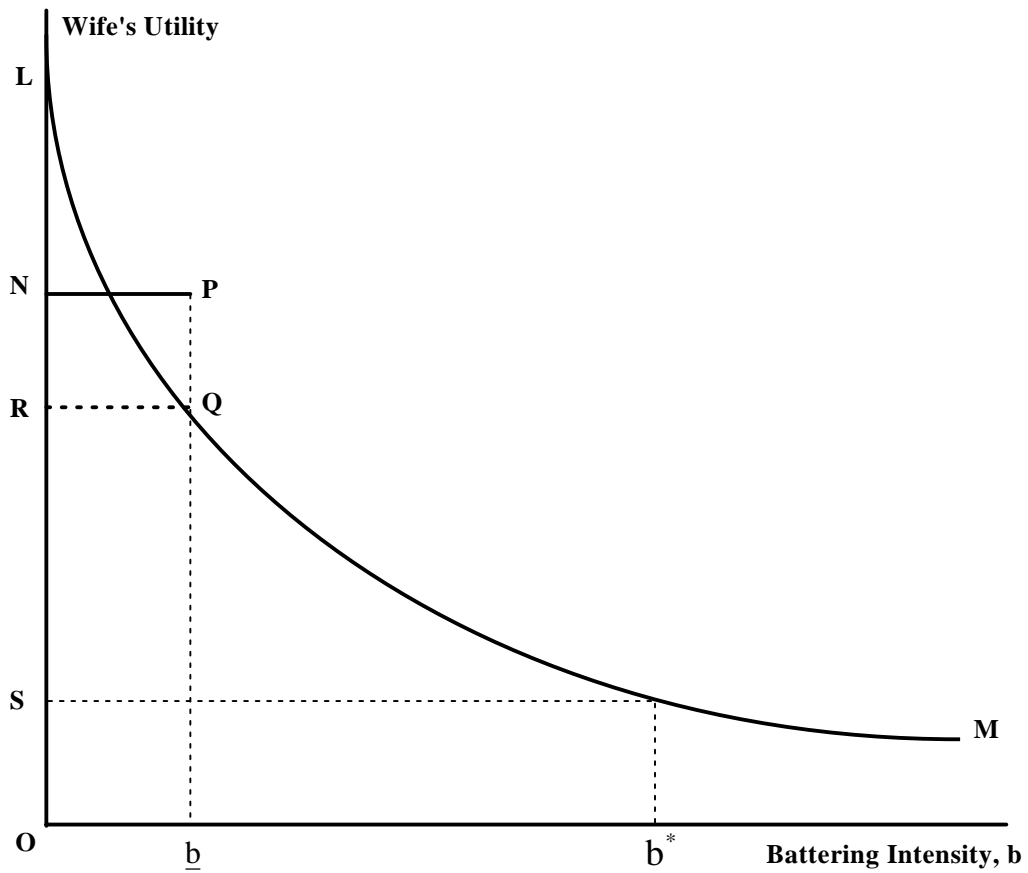
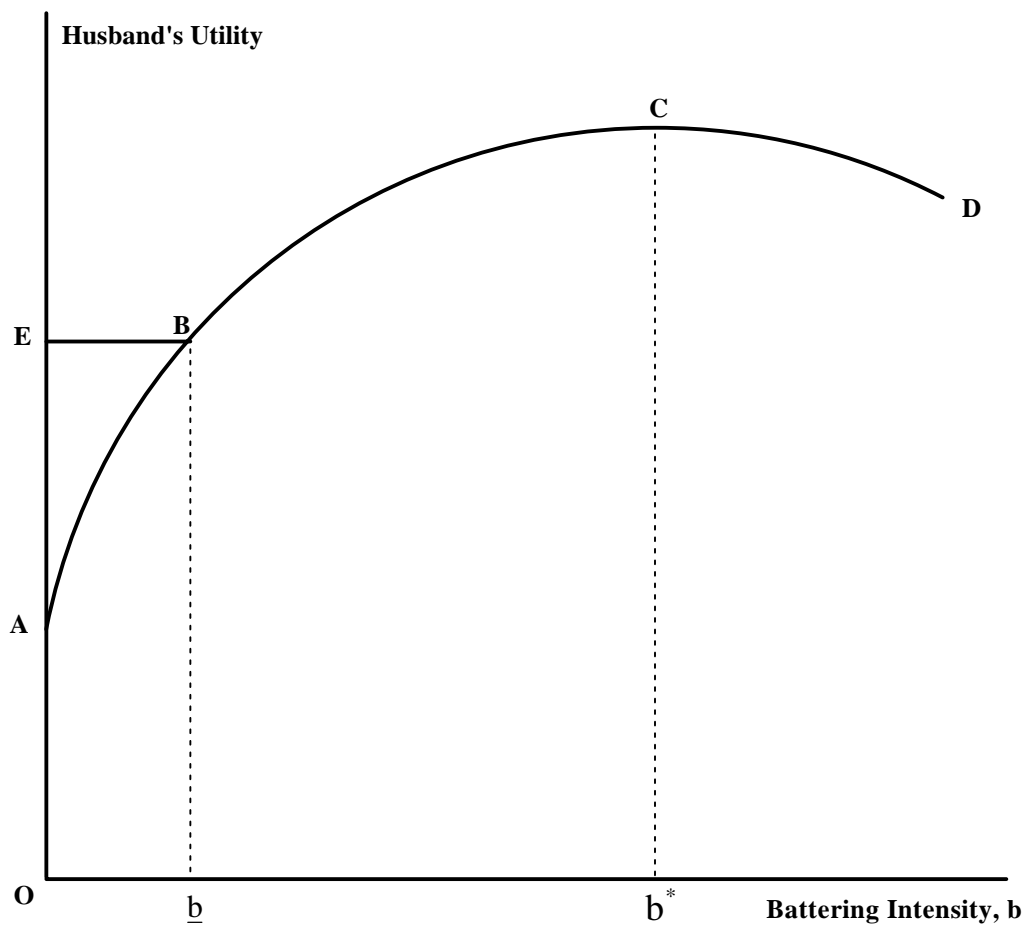


Figure 1: Determination of husband's battering intensity in equilibrium

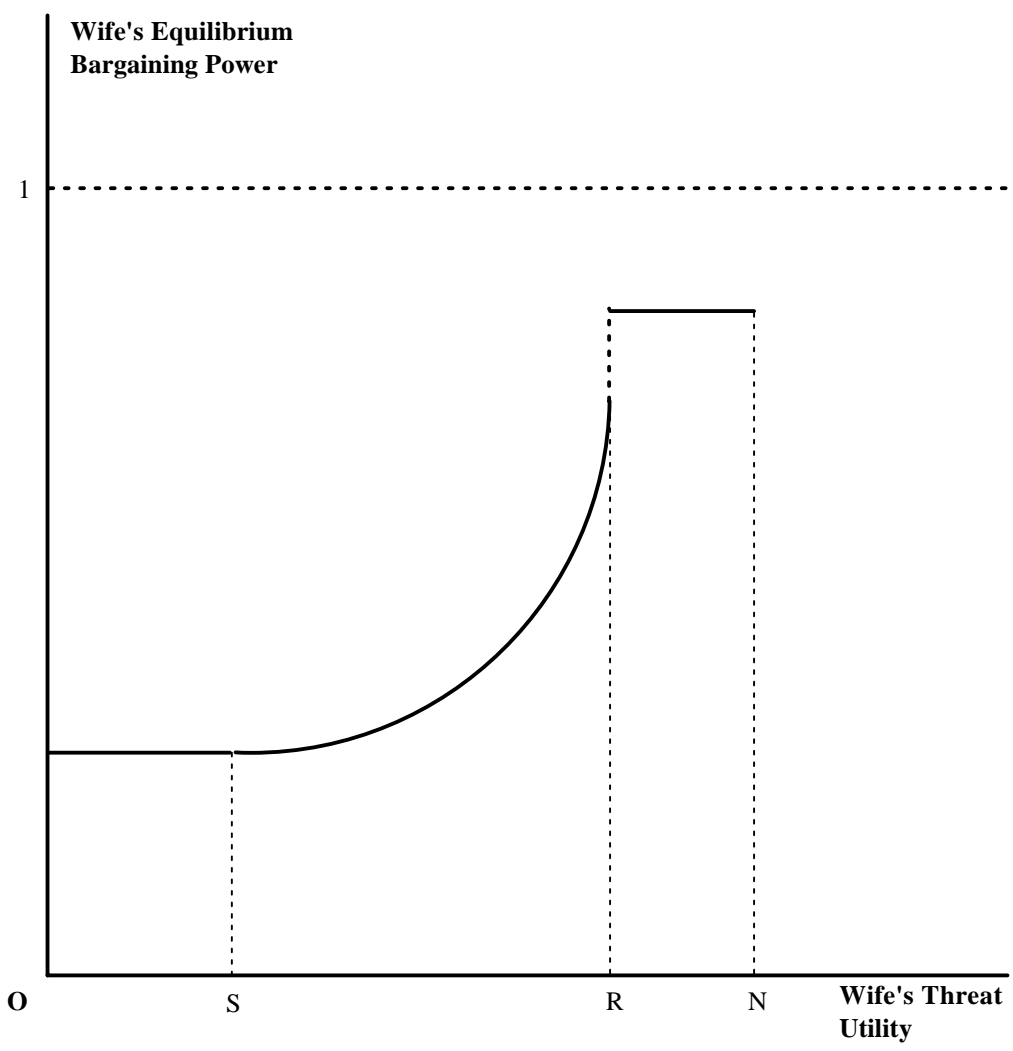


Figure 2: Wife's bargaining power in equilibrium as a function of her threat utility (for a given value of her husband's).

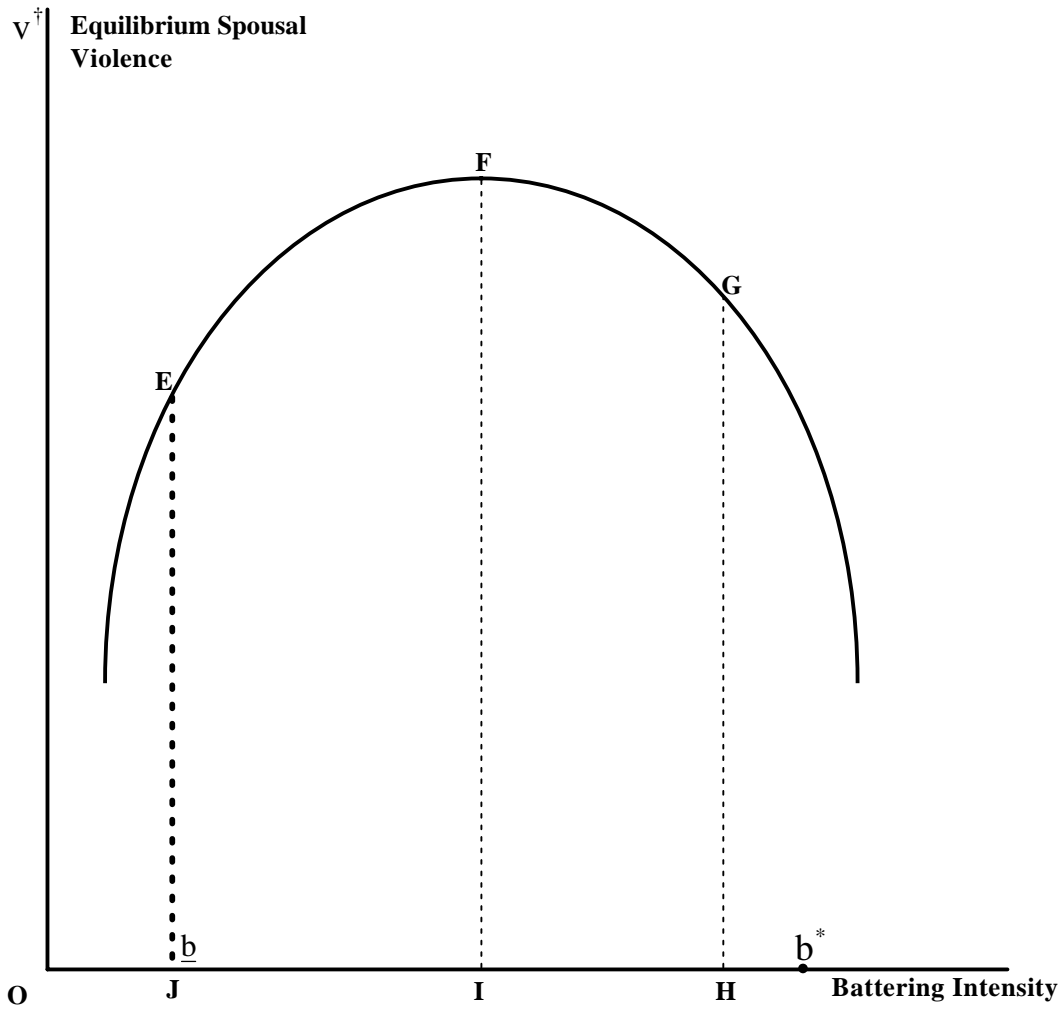


Figure 3: The equilibrium level of spousal violence as a function of the battering intensity.

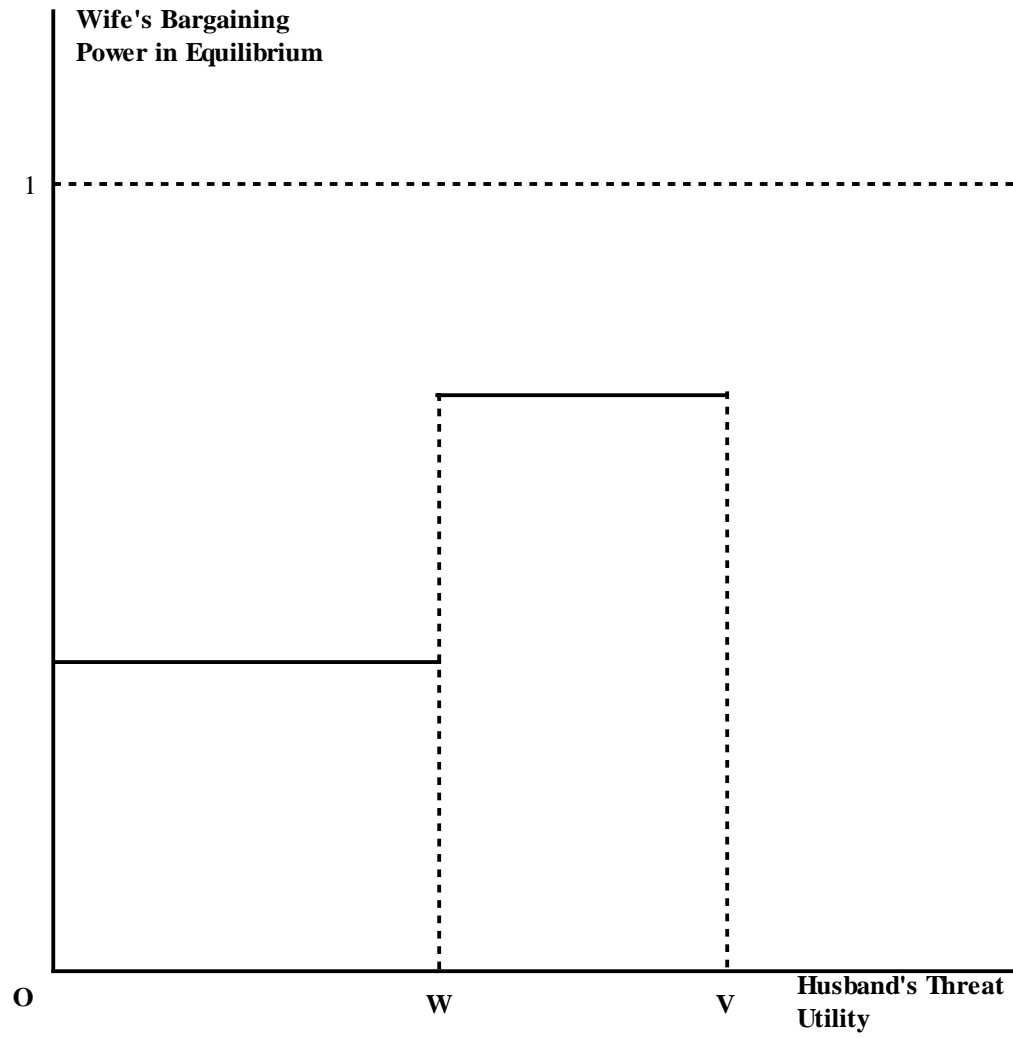


Figure 4: Wife's bargaining power in equilibrium as a function of her husband's threat utility (for a given value of her's).

Table 1: Summary Statistics of Outcome Variable.

VARIABLE	MEAN	STD. DEV.
Husband Has Beaten Wife (Ever)	0.18	0.38
Husband Has Beaten Wife (Past Year)	0.10	0.31
Decision_Cook	0.86	0.35
Decision_Health	0.50	0.50
Decision_Jewelry	0.52	0.50
Decision_Stay With Family	0.47	0.50
Don't Need Permission_Market	0.24	0.43
Don't Need Permission_Visit	0.20	0.40
Allowed_Own Money	0.55	0.50
Decision_Spend Money*¹	0.15	0.35
Number of observations: 58,502		

Table 2 Summary statistics for the sample of ever married women

VARIABLE	MEAN	STD. DEV.
Wife Weight-Deviation from Mean	0.00	8.07
Wife Height-Deviation from Mean	0.00	5.75
Woman-Illiterate	0.59	0.49
Woman-Less Than Primary	0.10	0.30
Woman-Primary School	0.08	0.26
Woman-Middle School	0.15	0.35
Woman-High School and above	0.09	0.28
Husband-Illiterate	0.31	0.46
Husband-Less Than Primary	0.12	0.32
Husband-Primary School	0.09	0.28
Husband-Middle School	0.24	0.42
Husband-High School and above	0.25	0.43
Length of Marriage	13.62	8.99
Woman's age at First Marriage	16.91	3.07
Unmet Desire for Sons	0.40	0.49
Pregnant-Currently or Past Year	0.23	0.42
Support from Mother	0.07	0.26
Self-employed	0.05	0.21
Work for Family member	0.19	0.39
Work for Someone Else	0.18	0.38
Nuclear Family	0.59	0.49
Living in Natal Joint Family	0.02	0.14
Living in Joint Family	0.38	0.49
Hindu	0.80	0.40
Muslim	0.10	0.31
Christian	0.05	0.22
Sikh	0.02	0.16
Low Social Economic Status	0.35	0.48
Medium Social Economic Status	0.50	0.50
High Social Economic Status	0.15	0.36
Schedule Caste	0.18	0.39
Schedule Tribe	0.15	0.35
Other Backward Classes	0.31	0.46

Table 3: Pair-Wise Correlation Coefficients

	Dependent Variable: Husband Has Beaten Wife (Past Year)	Wife Height- Deviation from Mean	Wife Height- Deviation from Mean
Dependent Variable: Husband Has Beaten Wife (Past Year)	1		
Wife Weight-Deviation from Mean	-0.0892*	1	
Wife Height-Deviation from Mean	-0.0581*	0.4122*	1
Wife's Weight (in Kgs)	-0.0916*	0.9885*	0.4074*
Wife's Height in (cms)	-0.0561*	0.4107*	0.9966*

Table 4: Domestic Violence

Dependent Variable: Husband Has Beaten Wife (Past Year)	OLS	Logit (Odds Ratio)
Wife Weight-Deviation from Mean	-0.001 (6.37)**	0.983 (6.21)**
Wife Height-Deviation from Mean	-0.000 (0.76)	1.000 (0.10)
Woman-Less Than Primary	0.005 (0.76)	1.065 (1.03)
Woman-Primary School	-0.020 (3.25)**	0.810 (2.86)**
Woman-Middle School	-0.020 (3.52)**	0.781 (3.51)**
Woman-High School and above	-0.023 (3.21)**	0.674 (3.54)**
Husband-Less Than Primary	-0.002 (0.29)	1.016 (0.27)
Husband-Primary School	-0.019 (2.69)**	0.861 (2.27)*
Husband-Middle School	-0.014 (2.76)**	0.910 (2.04)*
Husband-High School and above	-0.031 (5.78)**	0.741 (5.25)**
Length of Marriage	-0.002 (6.01)**	0.985 (6.02)**
Woman's age at First Marriage	-0.003 (4.74)**	0.965 (4.54)**
Unmet Desire for Sons	-0.000 (0.06)	0.995 (0.12)
Pregnant-Currently or Past Year	0.001 (0.26)	1.013 (0.29)
Support from Mother	0.020 (2.98)**	1.211 (3.14)**
Work for Self	0.034 (3.43)**	1.371 (3.67)**
Work for Family Member	0.027 (4.91)**	1.303 (4.74)**
Work for Someone Else	0.042 (6.65)**	1.430 (6.58)**
Living in Natal Joint Family	-0.047 (4.13)**	0.636 (3.45)**
Living in Joint Family	-0.035 (9.13)**	0.709 (8.71)**
Muslim	0.016 (1.89)+	1.183 (2.05)*
Christian	0.012 (0.75)	1.101 (0.62)
Sikh	0.021 (2.27)*	1.353 (2.13)*

Medium Social Economic Status	-0.024 (5.39)**	0.832 (4.57)**
High Social Economic Status	-0.037 (6.26)**	0.541 (6.87)**
Schedule Caste	0.020 (3.44)**	1.193 (3.11)**
Schedule Tribe	0.002 (0.30)	1.060 (0.78)
Other Backward Classes	-0.004 (0.82)	0.994 (0.10)
Observations	49118	49118
R-squared	0.05	

Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%. The coefficients for state dummy variables not shown

Table 5: Women's Autonomy- Involved in decision making

	Decision_Stay With Family	Decision - Jewelry	Decision _Health	Decision_Cook
Husband Has Beaten Wife (Last Year)	-1.281 (4.37)**	-1.404 (4.21)**	-0.615 (2.74)**	-0.525 (2.98)**
Woman-Less Than Primary	0.012 (1.08)	0.023 (1.87)+	0.027 (2.26)*	0.004 (0.63)
Woman-Primary School	0.001 (0.07)	0.002 (0.12)	-0.005 (0.44)	-0.014 (1.60)
Woman-Middle School	0.005 (0.39)	0.001 (0.10)	0.014 (1.22)	-0.009 (1.37)
Woman-High School and above	0.042 (2.71)**	0.052 (2.94)**	0.047 (2.60)**	0.007 (0.56)
Husband-Less Than Primary	-0.010 (0.69)	-0.008 (0.60)	0.005 (0.42)	-0.001 (0.18)
Husband-Primary School	-0.008 (0.49)	-0.006 (0.38)	0.002 (0.19)	-0.008 (0.82)
Husband-Middle School	-0.028 (2.12)*	-0.028 (2.31)*	-0.013 (1.45)	-0.015 (2.54)*
Husband-High School and above	-0.045 (2.86)**	-0.047 (2.84)**	-0.020 (1.60)	-0.028 (2.85)**
Length of Marriage	-0.000 (0.34)	0.000 (0.44)	0.002 (4.38)**	0.005 (11.57)**
Woman's age at First Marriage	-0.001 (0.54)	-0.002 (1.07)	0.004 (2.20)*	0.001 (0.51)
Unmet Desire for Sons	-0.020 (2.55)*	-0.026 (3.04)**	-0.024 (3.89)**	-0.012 (2.59)*
Pregnant-Currently or Past Year	-0.008 (0.88)	-0.010 (1.10)	-0.007 (0.92)	0.001 (0.21)
Support from Mother	-0.001 (0.08)	-0.002 (0.13)	0.000 (0.03)	-0.004 (0.49)
Work for Self	0.091 (4.34)**	0.124 (5.66)**	0.077 (4.37)**	0.023 (1.97)+
Work for Family Member	0.052 (3.56)**	0.049 (3.22)**	0.022 (2.33)*	0.018 (2.11)*
Work for Someone Else	0.090 (5.49)**	0.097 (4.93)**	0.081 (6.21)**	0.038 (3.93)**
Living in Natal Joint Family	-0.007 (0.26)	-0.065 (2.13)*	-0.041 (1.90)+	-0.142 (7.64)**
Living in Joint Family	-0.043 (3.11)**	-0.068 (4.48)**	-0.024 (2.22)*	-0.161 (19.66)**
Muslim	-0.013 (0.77)	-0.011 (0.64)	0.006 (0.44)	-0.011 (1.15)
Christian	0.043 (1.71)+	0.042 (1.35)	-0.004 (0.15)	0.014 (0.96)
Sikh	0.069 (1.90)+	0.058 (1.48)	0.009 (0.27)	0.031 (2.29)*
Medium Social Economic Status	-0.015	-0.029	-0.009	-0.026

High Social Economic Status	(1.19) -0.029	(2.24)* -0.043	(1.00) -0.022	(3.98)** -0.064
Schedule Caste	(1.43) 0.036	(2.19)* 0.032	(1.31) -0.002	(5.77)** 0.005
Schedule Tribe	(2.83)** 0.037	(2.19)* 0.026	(0.24) 0.022	(0.60) 0.003
Other Backward Classes	(2.31)* -0.003	(1.60) -0.005	(1.61) -0.007	(0.30) -0.008
Observations	(0.25) 49118	(0.43) 49118	(0.87) 49118	(1.21) 49118

Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%. The coefficients for state dummy variables not shown.

Table 6: Women Autonomy- Does not Need Permission

	Permission _Visit	Permission _Market
Husband Has Beaten Wife (Last Year)	-0.584 (2.39)*	-0.690 (2.81)**
Woman-Less Than Primary	0.005 (0.59)	0.004 (0.44)
Woman-Primary School	0.008 (0.77)	0.013 (1.19)
Woman-Middle School	0.004 (0.43)	0.018 (1.85)+
Woman-High School and above	0.040 (3.25)**	0.061 (4.90)**
Husband-Less Than Primary	-0.001 (0.12)	-0.004 (0.51)
Husband-Primary School	-0.008 (0.75)	-0.011 (1.08)
Husband-Middle School	-0.004 (0.57)	-0.003 (0.32)
Husband-High School and above	-0.006 (0.64)	-0.007 (0.67)
Length of Marriage	0.003 (7.21)**	0.004 (8.28)**
Woman's age at First Marriage	0.001 (0.89)	0.004 (2.68)**
Unmet Desire for Sons	-0.005 (1.03)	-0.002 (0.36)
Pregnant-Currently or Past Year	-0.005 (0.92)	-0.005 (0.88)
Support from Mother	-0.016 (1.66)+	0.002 (0.20)
Work for Self	0.067 (4.60)**	0.069 (4.84)**
Work for Family Member	0.037 (3.39)**	0.032 (2.88)**
Work for Someone Else	0.052 (3.55)**	0.062 (3.91)**
Living in Natal Joint Family	-0.019 (0.81)	-0.029 (1.23)
Living in Joint Family	-0.060 (5.34)**	-0.083 (7.27)**
Muslim	0.000 (0.04)	-0.016 (1.39)
Christian	0.015 (0.78)	0.014 (0.67)
Sikh	-0.010 (0.43)	-0.005 (0.14)
Medium Social Economic Status	-0.019	-0.021

	(2.46)*	(2.39)*
High Social Economic Status	-0.025	-0.042
	(1.82)+	(2.99)**
Schedule Caste	0.027	0.032
	(3.14)**	(3.05)**
Schedule Tribe	0.052	0.064
	(4.56)**	(5.59)**
Other Backward Classes	0.008	0.011
	(1.02)	(1.28)
Observations	49118	49118

Absolute value of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%. The coefficients for state dummy variables not shown.

Table 7: Women's Autonomy – Money Money Money

	Decision_Spend Money	Allowed_Own Money
Husband Has Beaten Wife (Last Year)	-0.049	-1.727
	(0.38)	(4.90)**
Woman-Less Than Primary	0.014	0.030
	(2.13)*	(2.00)*
Woman-Primary School	0.018	0.025
	(3.02)**	(1.36)
Woman-Middle School	0.016	0.046
	(2.55)*	(3.11)**
Woman-High School and above	0.052	0.126
	(6.57)**	(6.50)**
Husband-Less Than Primary	-0.003	0.004
	(0.45)	(0.28)
Husband-Primary School	0.005	-0.016
	(0.70)	(0.90)
Husband-Middle School	-0.000	-0.000
	(0.02)	(0.03)
Husband-High School and above	-0.001	-0.003
	(0.23)	(0.20)
Length of Marriage	0.001	0.002
	(5.18)**	(2.02)*
Woman's age at First Marriage	0.002	-0.001
	(2.17)*	(0.50)
Unmet Desire for Sons	-0.004	-0.012
	(1.31)	(1.26)
Pregnant-Currently or Past Year	-0.003	-0.005
	(0.89)	(0.49)
Support from Mother	-0.015	0.029
	(2.11)*	(1.58)
Work for Self	0.592	0.131
	(39.09)**	(5.59)**
Work for Family Member	0.131	0.045
	(16.70)**	(3.18)**
Work for Someone Else	0.569	0.131
	(54.25)**	(6.20)**
Living in Natal Joint Family	0.003	-0.089
	(0.23)	(2.83)**
Living in Joint Family	-0.017	-0.114
	(2.75)**	(7.06)**
Muslim	0.010	0.013
	(2.06)*	(0.58)
Christian	0.032	0.034
	(2.13)*	(1.09)
Sikh	0.012	0.012
	(1.12)	(0.48)
Medium Social Economic Status	-0.025	-0.004

	(4.76)**	(0.27)
High Social Economic Status	-0.027	0.026
	(3.40)**	(1.24)
Schedule Caste	0.009	0.037
	(1.52)	(2.09)*
Schedule Tribe	-0.010	0.022
	(1.15)	(1.14)
Other Backward Classes	0.004	0.022
	(0.94)	(1.78)+
Observations	49118	48999
R-squared	0.42	

Absolute values of t-statistics in parentheses: + significant at 10%; * significant at 5%; ** significant at 1%. The coefficients for state dummy variables not shown.