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Intrahousehold Bargaining, Domestic Violence Laws and Child Health Development in Ghana

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Abstract

I explore a unique exogenous instrument to examine how the intra-familial position of women influence health outcomes of their children using micro data from Ghana. Using the 2SLS-IV estimation technique, I build a model of household bargaining and child health development with perceptions of women regarding wife-beating and marital rape in the existence of domestic violence laws in Ghana. Even though the initial OLS estimates suggest that women's participation in decisions regarding purchases of household consumption goods help to improve child health outcomes, the IV estimates reveal that the presence of endogeneity underestimates the impact of women's bargaining power on child health outcomes. Our choice of instrument is robust to endogeneity, father characteristics and residency robustness checks.

Keywords: *Household Bargaining, Women Empowerment, Child Health Investment, Instrumental Variables, Domestic Violence*

JEL Classification: J12 J13

1. Introduction

Mothers play a critical role in fostering early childhood development, strongly influencing children's long-term intellectual and physical health (Smith and Haddad, 2000). However, despite progress in the last few decades, women continue to be disadvantaged in economic as well as familial spheres in many societies, with obstacles ranging from discrimination in the labor market, access to credit, to inheritance and ownership rights in the family (World Bank, 2011).

The recognition that the unequal distribution of intra-household power may have heterogeneous implications for parental investments in children has ignited a growing interest in intra-household resource allocation and its implication for developmental outcomes of children. This project revolves

around intra-familial position of women in Ghana and its implication for early childhood development regarding health.

A survey of the literature, however, reveals a lack of consensus on the measures of bargaining power. In the literature, bargaining power within households has been measured using direct and indirect proxies like relative income contribution, educational attainment, and direction of dowry, inheritance and ownership rights (e.g. Blumberg, 1988; Anderson and Eswaran, 2009; Friedemann-Sanchez, 2006). The differences in the measures of women's bargaining power may be attributed to the diversity in the political and social institutions and norms across countries and cultures.

It is therefore important from a policy point of view to understand the effect of women's bargaining power on early childhood development in each country through the lens of the norms and institutions that are peculiar to the culture of that country.

In this project, I argue that the effect of women's bargaining power on child health in Ghana is mediated through domestic violence laws, which protect women from marital rape and wife beating. The choice of domestic violence laws as an instrument for bargaining power will enable me to address any endogeneity associated with the direct measure of bargaining power. In the literature, when child development outcomes are regressed on direct measures such as women's degree of control over household decisions, they tend to yield biased and inconsistent Ordinary Least Square (OLS) estimates due to the endogeneity of the main regressor (Bernal and Keane, 2010).

Endogeneity may arise because in many societies, women with high quality (healthy and well-educated) children tend to gain more respect in the family and community, hence more bargaining power. In this case, the reverse causality becomes a threat to consistency. Endogeneity may also arise because in the Ghanaian society there is a traditional predilection for male children. As a result, women with male children tend to have a lot of respect within the family, obtain more bargaining power and may be able to invest more in their children (especially when they are all males).

To deal with the endogeneity, the 2-Stage Least Squares-Instrumental Variable (2SLS-IV) estimation technique is employed. I make use of the existence of domestic violence laws (which is captured as women's attitude toward wife beating for refusing to have sex with the husband) as an exogenous instrument for women's bargaining power. This instrument is exogenous because in jurisdictions like Ghana with judicial systems that protect women's rights, strong incentives exist for women to exercise their rights and participate more actively at all levels of decision making. These laws therefore confer bargaining power on women independent of the child.

The Domestic Violence (DV) Law, which has been in enforcement since 2007, contains provisions that criminalize various acts of violence – physical, economic and psychological abuse, intimidation, and harassment (Manuh, 2007). Therefore, there is an indication of low self-esteem or non-

empowerment if a woman (even after the passage of this law) believes that a husband is justified in beating his wife for refusing sex. Such a perception could act as a barrier for women in accessing effective health care for themselves and their children (Ghana Demographic and Health Survey, 2008).

To understand this whole interaction within a structure, this paper develops a model of household bargaining with women's attitude toward wife beating and marital rape and its implication for child health outcomes. The implications of the model are then tested using the 2008 Ghana Demographic and Health Surveys (*hence* GDHS) data. The choice of Ghana is important because it allows me to explore the existence of domestic violence laws as a unique instrumental variable for the first time in the literature.

It also helps to provide robust empirical support for designing policy measures targeted at bridging gender gaps to affect child development outcomes in Ghana, where women lack influence in household decision-making, mainly because of strong patriarchal family structures, even though they constitute more than 50% of the population (Baden et al, 1994)

This is the first paper to explore domestic violence as an instrumental variable for women's bargaining power whilst testing its implications for child health outcomes using a unique micro data set.

2. Research Questions

I have two objectives. First, to identify an exogenous instrument for women's bargaining power and to construct a model with this exogenous instrument to examine the effect of this power on child health outcomes using micro-level data from Ghana.

3. Literature Review

a. Theoretical Literature

Several useful models on intra-household resource allocation and bargaining have emerged after a substantial body of literature on household bargaining questioned the validity of the traditional unitary household model. The unitary model, which treated household as a single unit with common preferences, utility, decisions and choices, has been unable to withstand a number of empirical verifications (e.g. Schultz, 1990 and Thomas, 1990).

As a result, there is a growing consensus in the literature that the household behavior cannot be modeled as though members of the household had a set of stable preferences. However, though there exist several useful alternatives, there is no agreement on the best way to model household behavior. Indeed, the literature recognizes that models on household bargaining may differ to reflect the social, economic and cultural contexts in which they are used (Chiappori et al, 2006). In this section, I provide a brief overview of some of the existing models proposed to replace the unitary model.

Collective Model

The collective model developed by Chiappori (1988) and restructured by Chiappori et al (2006) recognizes individual preferences within a household and enables individual bargaining power to influence household choices and outcomes. The model assumes that regardless of how decisions are made, outcomes made under these assumptions are always Pareto efficient. The implications of this model have been upheld by several empirical studies (e.g. Vermeulen, 2000).

Non-Cooperative Model

The non-cooperative model assumes that resources earned by individuals are expended according to individual preferences and interests (Ulph, 1988). There exists no pooling of resources as it happens in the unitary or cooperative models. There are, however, mixed opinions in the literature on whether outcomes made under the assumptions of this model are Pareto-efficient (Bourguignon et al, 1993 and Udry, 1996).

The Cooperative Bargaining Model

The cooperative bargaining model, also like the collective model, assumes that household bargaining outcomes are Pareto-efficient. It, however, establishes more firmly the process by which the Pareto-efficient outcomes are attained, by assuming the presence of a threat point for each household member (Elroy and Horney, 1981 and Manser and Brown, 1980). The threat point is usually an external utility option to members of the household. An example of this outcome is “divorce,” where the threat point for the household is dissolving the marriage. The efficiency of divorce as a threat point for intra-household bargaining, however, remains largely debatable (Lundberg and Pollak, 1993). Per the data used in this paper, household decisions are made under the assumptions of the cooperative bargaining model where resources are pooled and decisions made reflect individual preferences. The threat point for making Pareto-efficient decisions lies in the ability of any “abused” member of the household to exploit or use domestic violence laws to seek redress.

b. Empirical Literature

A number of studies suggest that women’s participation in economic activities is a sustainable way to help build human capital in developing countries. This section surveys the results of extant studies, on the subject of intra-household bargaining and child development outcomes.

Using women’s ethnicity, “arguably,” as an instrument for bargaining power, Lepine and Strobl (2013) found that women with bargaining power tend to have children with better nutritional status in rural Senegal, whilst Ueyama (2006), with household survey data from rural Malawi, found that women’s participation in agriculture has a positive effect on child health, through the added “income effect” and “food effect.” Afridi et al (2012), also studying the impact of India’s National Rural Employment Guarantee Scheme (NREGS) on children’s educational outcomes via women’s labour force

participation, found that greater participation of mothers in the program was associated with better educational outcomes of their children.

Similarly, Smith (2003) also using DHS household surveys for 36 South Asian, Sub-Saharan Africa, Latin American and the Caribbean countries, found a strong association between the index of a woman's decision-making power and her child's nutrition.

On his part, Kishor (2000) used data from Egypt's 1995 DHS and employed multivariate analyses to explore the correlations between women's empowerment and child health. The study found that a woman's lifetime exposure to employment is significantly correlated with both child survival and health.

Furthermore, studies such as Haddad et al. (1997), Thomas (1997), Quisumbing and Maluccio (2000), Doss (2001), Duflo and Udry (2004) and Fantahun et al (2007) also found a positive relationship between women's empowerment and child development outcomes.

Even though cultural norms and political institutions strongly influence child outcomes by either constraining or improving women's bargaining positions, there exist major gaps in the literature in spelling out the dynamics of these processes (Agarwal, 1997). This is because a majority of the literature has tended to focus on more direct and observable measures such as incomes, education, participation in a microfinance program or agriculture, etc. For example, in view of the societal preference for male children in China, women with first-born sons have been found to have greater bargaining power than women with first-born daughters (Li and Wu, 2011).

This paper thus seeks to fill this gap by investigating how the existence of institutions that protect women from domestic violence influence women's bargaining positions and subsequently how this translates into child development outcomes. The implications of this model, I believe, can be replicated in other societies with little regard to the cultural or economic setting of the society.

c. Domestic Violence Laws

Like many developing societies with strong patriarchal family structures, marriage in Ghana is associated with high social esteem. For many societies, though the certificate of marriage confers certain rights and powers on the partners involved, the degree of control over decision making within the marriage is unequally shared between partners.

This is because the customary institution, which represents the primary source of legitimacy for most marriages in Ghana, does not view women and men as equal partners in marriage. Generally, the woman is expected to be subservient and obedient to the husband, and the husband is expected to exercise maximum control to keep the house in order. Dery and Diedong (2014) observes that a prime example of this is the traditional right of men to discipline their wives through beating. However, this beating should be reasonable, such that it does not cause awful physical injuries or death. Given this cultural foundation,

it is not surprising that domestic violence was seen as a normal practice and a means of maintaining order in the household.

To control domestic violence, the government of Ghana in February 2007 passed the Domestic Violence (DV) Act 732, which mandates the Domestic Violence and Victims Support Unit (*hence* DOVVSU) to fight domestic violence in all its forms and to set up a victim support fund to advance that cause (GDHS, 2008). The passage of the DV Act has since criminalized most acts of violence against women and children, and has fundamentally changed the perception of Ghanaian women on domestic violence, including making it a crime for a husband to force their wives into having sex without consent. This has provided a fundamental pathway to empower women by granting women in the household the right to make choices and decisions that best represent their individual interests without fear of abuse from their partners.

Evidence from the literature confirms this assertion. For example, Dery and Diedong (2014), using survey data from the Upper West Region of Ghana, found that proximity of a household to the police or the DOVVSU is negatively related to the occurrence of violence within that household and that physical violence has been on a decrease since the passage of the law.

On the back of this information, the paper explores domestic violence laws as an exogenous instrument, which confers bargaining power on women independent of child outcomes. This helps deal sufficiently with any potential endogeneity of the main regressor.

4. Research Design

Data and Sampling Techniques

The study is based on micro level data on Ghana from the 2008 Ghana Demographic and Health Survey administered by the United States Agency for International Development (USAID). The survey, which is based on a nationally representative household sample, provides data for 11,778 households. The survey employed a two-stage sample design. The first stage involved selecting 412 sample points from an updated master sampling frame constructed for the 2000 Ghana Population and Housing Census, using systematic sampling with probability proportional to size. The second stage involved systematic sampling of 30 of the households listed in each cluster.

On the data collection, three separate questionnaires were used to collect information from the selected sample: namely, the household questionnaire, the women's questionnaire and the men's questionnaire. This paper uses data from the women's survey, which contains information on all women age 15-49 in half of the sample households. These women were asked questions about themselves and their children born between 2003 and 2008 on topics including but not limited to education, media exposure, wealth, vaccinations and childhood illnesses, marriage, occupation and husband's background

characteristics, childhood mortality and domestic violence. For the purpose of this research, I give a brief overview of the key variables of interest as presented in the DHS survey in the following section:

a. Attitude towards Wife Beating and Domestic Violence

To capture the empowerment effect of gender equity, the survey collects data on women's attitude toward wife beating and other forms of violence as a proxy for women's status in the household. Respondents were asked whether a husband is justified in beating his wife under a series of circumstances: when wife burns the food, when wife argues with him, when wife goes out without telling him, when wife neglects the children, and when wife refuses to have sex with him. Per the structure of the survey, responses that suggest a justification of wife beating by husbands is seen as a reflection of the woman's low status. Such views show the acceptance of cultural norms that give men the right to use force against women (GDHS, 2008).

b. Household Decision Making Module

In addition, the survey collected data on direct measures of women's participation in household decision-making. Respondents were asked about who makes the final decisions regarding the following issues: their own health care and purchases of daily household consumption goods, etc. Having a final say in the decision-making process is the highest degree of autonomy. Women are considered to participate in decision making if they make the decision alone or jointly with the husband. Such information provides insight into women's control over their environment and their attitudes toward gender roles, both of which are relevant to understanding women's ability to make independent decisions about their own health care and that of their children (GDHS, 2008).

c. BMI Measurements of Children

The nutritional status of young children provides a useful gauge for assessing their future health and development prospects. However, many under-five children in developing countries are often exposed to the risks of childhood illnesses and nutritional deficiencies, which significantly affect their long-term health development (GDHS, 2008). This paper uses the Body Mass Index (BMI) of children as a measure of their health status. The BMI, which is measured as weight adjusted for height, is calculated as weight in kilograms divided by the square of height in meters. The BMI is important because it reflects both current and past nutritional investment in children (GDHS, 2008). Again, the World Health Organization (2006) notes that differences in children's weight and height growth up to their fifth birthday are more influenced by nutrition and health care than genetics or ethnicity. Even though genetic factors matter for child height, Martorell and Habicht (1986) explain that they only become more critical in adolescent years.

The data used captures the BMI as a Z-score. The BMI Z-score can be understood as the number of standard deviations of child's BMI, from the average BMI of her reference group. The World Health

Organization uses the Multi-Centre Growth Reference, which comprises more than 8,000 children from Brazil, Ghana, India, Norway, Oman and the USA, selected because they grew up in an environment that is deemed optimal for a child's growth (WHO, 2006). In this data, the Z-score is mathematically given as,

$$Z\text{-score} = \frac{X_{ij} - \mu_{ij}}{\sigma_{ij}},$$

Where X_{ij} represents the observed height-adjusted weight (BMI) of child of age i and gender j whilst the μ_{ij} and σ_{ij} represents the mean and the standard deviations of the reference group with age i and of gender group j . Based on the classifications of the World Health Organization (2006), a child whose BMI is below -2 standard deviations of the reference group's average BMI is considered too thin or underweight for her age and gender while a child is said to be overweight if her BMI exceeds +2 standard deviations of the reference group's average BMI. In this paper, we argue that children whose mothers have a major say in deciding daily household consumption goods have higher BMI than their reference groups.

5. Estimation Technique and Methodology

This paper uses the 2-Stage-Least-Square Instrumental Variable (2SLS-IV) estimation approach. Per this technique, I build three different models at different stages of the estimation process. The first model, which is the most parsimonious model, estimates the relationship between Child's BMI Z- score captured as *HealthStatus_{ij}* of child i in household j , and the mother's degree of say in making decisions on the daily needs for the home, which is captured as *MumPower_{ij}*. This is represented mathematically as:

$$HealthStatus_{ij} = \alpha_0 + \alpha_1 MumPower_{ij} + \alpha_2 FamilyWealth_{ij} + \alpha_3 MumEduc_{ij} + \epsilon_{ij}$$

Based on the data, I create a dichotomous variable for the main regressor. That is, in measuring women's bargaining power, a woman who has a major say in deciding daily household consumption goods is given a value of 1 whilst women who have no say at all in making purchases for meeting household daily needs is given a value of 0. Whilst women who make decisions alone possess absolute power in making daily household consumption goods decision, the data does not state specifically what degree or proportion of power is exercised by women when they make decisions jointly with the husband. For the purpose of this paper, we assume that in making joint decisions, women best represent their interests and that of their children.

I expect **mumpower** > 0 so that women's bargaining power is positively related to a child's BMI Z-score. **FamilyWealth** represents the wealth index of the family. It is a dummy variable for a poor household whilst **MumEduc** captures whether the woman has ever received formal education greater than or equal to primary school, and the stochastic term ϵ_{ij} represents the collective impact of unobserved factors on the child's BMI Z-score.

The second model, which represents the first stage of the 2SLS-IV estimation, uses the logistic regression to estimate the probability that a woman will have bargaining power, given her attitude to wife

beating for refusing sex. Here, a woman who thinks wife beating is justified assumes a value of 0 whilst a woman who think it is not justified assumes a value of 1. Approximately 17% of the population reported that it is justifiable for a man to beat his wife for refusing sex.

$$\text{Logit} (\text{MumPower}_{ij}) = \gamma_0 + \gamma_1 \text{Dviolence}_{ij} + \gamma_2 \text{MumEduc}_{ij} + \gamma_3 \text{MumEmplo}_{ij} + \varepsilon_{ij}$$

Where **Dviolence** is the domestic violence dummy, **MumEduc** is an educated mother dummy and **MumEmplo** is the dummy for a working mother.

Guided by the literature I expect **Dviolence** >0, that is women who reject domestic violence should be associated with bargaining power. **MumEduc** and **MumEmplo** control for the impact of the woman’s education and participation in economic activity in determining her bargaining power whilst the error term, ε_{ij} , captures the effects of unobserved factors on women’s bargaining power. If the hypothesis holds, in the second stage of estimation, I replace **MumPower** with the predicted value of **MumPower** in the second stage of the regression model. This yields the following model:

$$\text{HealthStatus}_{ij} = \alpha_0 + \alpha_1 \text{PredictedMumPower}_{ij} + \sigma^2 \varepsilon_{ij}$$

My a priori expectation is that $\alpha_1 > 0$, and is different from the α_1 in the model, which means that women with bargaining power have children who are likely to have more weight than their reference group. This model also includes a set of controls, as robustness check, primarily, mother’s educational and health characteristics, participation in economic activity, access to mass media, household income, demographic and father characteristics, which may affect child health through unobserved channels. The controls are briefly outlined in the ensuing section.

Mother’s Education

The literature is well replete with evidence on the positive associations between child development and maternal education. Education offers an important channel for empowering women with the knowledge, skills and self-confidence necessary to participate fully in the development process (UNFPA, 2013). Educated women are able to make informed decisions on their health and that of their household members. Given the pivotal role maternal education or the lack thereof plays in child health development, this paper includes a measure that captures whether the mother in question has ever received any form of education. This dummy is constructed from the data by assigning zero to women who had no education and 1 to those who have obtained either primary, secondary or tertiary education. The model does not include measures that captures the individual effects of the different levels or stages of education on child health outcomes. Again, there is a possibility that the impact of maternal education is underestimated because educated mothers tend to have more surviving children and thus the sampling of living children may result in an over-representation of children of educated mothers (Desai and Alva, 1998). However, since educated women tend to be associated with lower fertility rates than uneducated mothers, we hope that, at best, the two effects compensate each other.

Household Wealth Index

The model also controls for the general effect of the household income level on the probability that the child is anemic. This is done by including the wealth index variable, which is a composite measure of a household's cumulative living standard, calculated by using easy-to-collect data on a household's ownership of selected assets, access to water and sanitation facilities. This index is important because it allows me to tease out the relative impact of household income on child health. In the GDHS data, based on the composite score, households are classified under 1 of 5 categories in an ascending scale of income: namely, poorest, poorer, middle, richer and richest. Based on this, I create a dummy to capture poverty, which assumes a value of 1 if the household is poorer or poorest and 0 if the household is not.

Father's Educational Characteristics

Father's educational characteristics can influence child's health through multiple channels. Educated men are less likely to subject their wives to domestic violence and hence lead to greater empowerment of women, which in turn translates into better child outcomes. Again, educated fathers are on average healthier and are more likely to produce and raise healthy children. For instance, Thomas (1994) finds a positive association between child health and higher father's educational attainment. By not controlling for father's education, the impact of mother's empowerment on child outcomes may be overestimated. It is therefore important to tease out the relative impact of father's education by including a variable that captures this measure. In this paper, I control for father's educational characteristics by including two dummies that capture whether the woman's partner or husband has had any formal education.

6. Empirical Findings

OLS Estimates

Table 1 presents the summary of empirical findings from both the initial OLS and the Instrumental Variable estimates. The results suggest that all the predictor variables apart from mother's age, participation in economic activity and household wealth are significant in explaining the variation in Child BMI. Specifically, the OLS estimation suggests that women who take part in making decisions regarding daily household purchases have children whose Body Mass Index are about 0.15 standard deviations (SD) greater than the average BMI of their reference group, and this is significant at about 5%. The OLS estimates also show that a unit increase in a mother's own Body Mass Index (proxy for maternal health) is associated with an average of 0.04 standard deviation increase in her child's BMI whilst increases in mother's years of education and child age also increase child BMI by about 0.19 and 0.09 standard deviations, respectively.

First Stage Logistic Estimation

The first stage IV estimation results are summarized in Table 2. The results of the first stage estimation are consistent with our priori expectations; women who do not believe that domestic violence is justified are likely to have the power to make decisions on daily household purchases, either alone or with the husband. The co-efficient of the domestic violence variable is 0.85 in the absence of controls and is highly significant, below 1%. After controlling for woman's education and her participation in economic activity in the past year, the co-efficient of the domestic violence variable falls to 0.68 but still remains highly significant. Again, our endogeneity concerns are shown to be consistent with the first stage estimation, which shows that women with female children tend to have lower bargaining power whilst women with healthy children (higher BMI Z-scores) tend to have more bargaining power.

Second Stage Estimation

After replacing mother's bargaining power with the predicted values of mother's bargaining power (which is domestic violence) from the first stage IV estimation, we find that child Body Mass Index increases by about 2.5 SDs for women who have bargaining power and remains highly significant. This is about 2.35 SDs higher than the co-efficient of the OLS estimation. In this first model of the second stage estimation, we still control for mother's characteristics of health (BMI), years of education, age, and participation in economic activity over the past 12 months. We also include child age and household poverty to control for the unobserved influences of these factors on child health. The results suggest that an increase in a mother's BMI is associated with about 0.05 standard deviations increase in child BMI. An additional year in a child's life also leads to about 0.09 SD increase in the child's BMI. These findings are all consistent with the literature. Mother's participation in economic activity is surprisingly found to be negatively related to child health outcome and is statistically significant. Whilst we cannot say much about causality, we assume that happens if women's participation in economic activity keeps them away from children to the extent that it becomes detrimental to child health. The results also suggest that an increase in a woman's age is negatively related to the health outcome of her child, and it is statistically significant. Even though this result comes as a surprise, it could also reflect the fact that older women are less acquainted with the recent domestic violence laws and are more in tune with the dictates of the norms and traditions, which limit their participation in household decision making regarding their own health and that of their children. Poverty also surprisingly remains insignificant as a determinant of child health outcome in both OLS and second stage IV regressions.

In the second IV model, we control for the unobserved influences of father's educational characteristics (uneducated father) and age, as well as the possible impact of rural residency on child health. The results, which are also summarized in Table III, suggest that father's age, educational attainment and rural residency have no significant impact on child health. However, the co-efficient

of the previous variables change. This may suggest that, in the presence of an old and uneducated father in a rural household, the mother's bargaining power increases child BMI by 3.08 standard deviation over the reference group, which is consistent with the literature. Under these controls, a mother's age and participation in economic activity remain significant and negatively related to her child health whilst child age continues to be positive and significant, as well, but with a higher coefficient.

Hausman Test for Endogeneity

To test whether the suspected endogenous variable is indeed endogenous and whether our instrumental variable is exogenous, we employ the Hausman test for endogeneity. To do this, we run a reduced form of the baseline regression with Mother's Power as dependent variable. This yields the model.

$$\mathbf{MumPower} = \pi_0 + \pi_1 X_{1ij} + \pi_2 X_{2ij} + \pi_3 X_{3ij} + \pi_4 X_{4ij} + \pi_5 X_{5ij} + \pi_6 X_{6ij} + \pi_7 X_{7ij} + \varepsilon$$

Where X_1 is the domestic violence dummy, X_2 is woman's education in years, X_3 is Woman's BMI, X_4 is Child Age, X_5 is dummy for whether the woman is working, X_6 is the woman's age in years, and X_7 is the household wealth dummy, whilst ε is the error term. Since we suspect that the MumPower variable suffers endogeneity from unobserved reverse causation and omitted variable bias, we include the residuals from the reduced form equation in the structural form regression below,

$$\mathbf{HealthStatus} = Z_0 + Z_1 X_{1ij} + Z_2 X_{2ij} + Z_3 X_{3ij} + Z_4 X_{4ij} + Z_5 X_{5ij} + Z_6 X_{6ij} + Z_7 X_{7ij} + Z_8 \varepsilon_i + \mu_i$$

where Z_1, Z_2, \dots, Z_7 are the explanatory variables in the baseline IV regression, while Z_8 is the residuals of the reduced form model.

The model is run on the null hypothesis that the ε is statistically insignificant and $Z_8 = 0$. If the null hypothesis holds, then MumPower is exogenous and does not need IV estimation. However, our Hausman test results, summarized in Table 3.0 of the Appendix section, shows that the reduced form residuals are statistically significant and thus we reject the null hypothesis that the mother power is exogenous. This also confirms that domestic violence dummy is an exogenous instrument for the mother's bargaining power variable.

Conclusions

This paper set off to investigate the impact of women's bargaining power on child health outcomes. To achieve this, we build a model of intrahousehold bargaining with perceptions of women regarding domestic violence and marital rape, and its implications for child health outcomes using the 2-SLS Instrumental Variable technique in order to circumvent endogeneity resulting from omitted variable bias and unobserved reverse causality between the dependent variable and main regressor. Our Hausman test for endogeneity confirmed this as an exogenous instrument and the IV estimates showed that the impact of women's bargaining power on child health is underestimated by the biases in the OLS estimation. We also found consistent with the literature that the years of education obtained by a woman and her health status directly mattered for the health of her child. Whilst father's illiteracy and rural residency and

poverty in the household do not matter directly for child health, per our sample, we find that the impact of women's bargaining power on child health tend to increase in households where the father has no education.

This paper provides strong empirical evidence for women empowerment in order to drive investments in child health, especially in countries where strong patriarchal family structures prevent the effective participation of women in the household decision-making process. The paper shows that a simple, well-carved legislation that protect women from domestic violence and abuse could tremendously improve women's bargaining positions and allow them to independently make decisions that are in the best interest of themselves and their children.

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APPENDIX

Table 1.0 Results of OLS and IV Estimations

Child BMI	OLS Estimates		2SLS- Model 1		2SLS-Model 2	
			Instrument = Domestic Violence			
Mother's Power	0.148**	[0.076]	2.528***	[1.231]	3.080*	[1.177]
Mother's BMI	0.037***	[0.008]	0.046***	[0.011]	0.051***	[0.014]
Mother's Education	0.185***	[0.073]	0.143	[0.095]	0.134	[0.116]
Mother's Age	-0.004	[0.005]	-0.022**	[0.012]	-0.036**	[0.016]
Mother Working	-0.068	[0.115]	-0.643**	[0.331]	-0.778*	[0.448]
Child Age	0.094***	[0.025]	0.091**	[0.032]	0.098***	[0.037]
Household Wealth (if Poor)	-0.060	[0.074]	0.127	[0.397]	0.036	[0.154]
Non-Educated Father					-0.098	[0.122]
Father's Age					0.009	[0.007]
Residence (if Rural)					0.170	[0.139]
Observations	1563		1563		1471	
R-Squared	0.04		
F-Stat /Wald Chi ²	9.29***		42.13***		39.63***	
*** Significant at 1% ** Significant at 5% *Significant at 10%						

Table 2.0 Results of First Stage Logistic IV Regression

Woman's Power	Co-efficient	P-Value	Std. Error
Domestic Violence (No Controls)	0.085***	0.000	0.019
Domestic Violence (With Controls)	0.068**	0.002	0.027
Woman's Years of Education	0.032	0.147	0.022
Woman Working	0.235***	0.000	0.038
Woman's Age	0.007***	0.000	0.001
Child Gender (if Female)	-0.05**	0.025	0.021
Child BMI	0.84**	0.087	0.008

Table 3.0 Hausman Test for Endogeneity

Reduced Form Model (Dependent =Mother's Power)		Structural Equation (Dependent= Child Health)	
Variables	Co-Efficient [P-Value]	Variables	Co-Efficient [P-Value]
Domestic Violence ¹	.361 [0.004]**	Mother's Power	1.553[0.009]**
Woman's Years of Education	0.543[0.642]	Woman's Years of Education	0.171[0.019]**
Woman's BMI	-0.013[258]	Woman's BMI	0.039[0.000]***
Child Age	0.021[0.147]	Child Age	0.086[0.001]***
Woman Working	1.241[0.000]***	Woman Working	-0.438[0.023]**
Woman's Age	0.037[0.000]***	Woman's Age	-0.012[0.046]**
Household Wealth	-.309[0.009]**	Household Wealth	0.027[0.740]
***Significant at 1%, **Significant at 5% and * at 10%		Reduced Form Residuals ²	-0.584[0.017]**
¹ Domestic Violence is statistically significant		² Residuals are statistically significant	
H ₀ = Residual= 0 i.e. Mother Power is exogenous		Since The Residuals in the Structural Equation is statistically significant at 5% we	
H ₁ = Residual ≠ 0, i.e. Mother Power is endogenous			

Table 4 .0 Summary Statistics					
Variable	Sample Size	Mean	Std. Dev.	Min	Max
Child BMI Z-score	1759	-0.54	1.27	-3.94	5.89
Child Gender Dummy (2 if female, 1 if male)	3299	1.48	0.50	1	2
Child Age in Years	3128	4.39	5.08	0	5
Woman's Age	4916	28.99	9.70	15	49
Mother Power Dummy	2948	0.78	0.41	0	1
Woman's BMI	4814	23.42	4.69	12.18	57.61
Woman's Educated Dummy (1 if Yes , 0 if No)	4916	0.75	0.44	0	1
Woman Working Dummy (=1 if yes, 0 if No)	4916	0.78	0.42	0	1
Domestic Violence (Dummy)	4916	0.83	0.38	0	1
Father's Education Dummy (1 if not educated, 0 if yes)	4916	0.83	0.38	0	1
Father's Age in Years	2902	40.23	11.12	18	85
Household Wealth Status (1 if poor, 0 if not-)	4916	0.409	0.49	0	1
Residence Dummy (1 if Rural, 0 if Urban)	4916	1.56	0.50	0	1

Annotated Bibliography- Domestic Violence, Intra-household Bargaining and Child Health

Development in Ghana-

Author:

AHMED SALIM NUHU

Agarwal, B. (1997). "Bargaining" and Gender Relations: Within and Beyond the Household. *Feminist economics*, 3(1), 1-51.

This paper spells out the nature of the complexities of gender relations and their importance in determining the outcomes of intra-household dynamics. It also extends the bargaining approach beyond the household to the interlinked arenas of the market, the community and the State. This was very helpful in helping me understand how state policies could disrupt gender relations. It was helpful in determining which variables entered my model and also shaped my hypothesis regarding the relationship between women's bargaining power and domestic violence laws.

- 1. Anderson, S., & Eswaran, M. (2009). What determines female autonomy? Evidence from Bangladesh. *Journal of Development Economics*, 90(2), 179-191.**

This paper examined the determinants of female autonomy within households in a developing country. They found that earned income could be more important than unearned income in empowering women. This paper also showed me how non-market factors like laws can empower women. In fact, it is the primary reason for which domestic violence was used in my model.

- 2. Afridi, F., Mukhopadhyay, A., & Sahoo, S. (2016). Female labour force participation and child education in India: the effect of the national rural employment guarantee scheme. *IZA Journal of Labor & Development*, Forthcoming 2016**

This paper studied the impact of India's National Rural Employment Guarantee Scheme on children's educational attainment via women's increased access to labour-market opportunities. Using child-level

panel data, they find that a rise in the mother's share of parental NREGS workdays increases the school attendance and grade attainment of her children, particularly girls. This was particularly important in helping me identify the theoretical channels via which mother's bargaining power affects child outcomes.

- 3. Dery, I., & Diedong, A. L. Domestic Violence against Women in Ghana: An Exploratory Study in Upper West Region, Ghana. *International Journal of Humanities and Social Science* Vol. 4, No. 12; October 2014.**

This paper was conducted in the Upper West Region of Ghana and aimed to explore domestic violence from the perspectives of adult men and women. The study participants were selected based on purposive sampling. The data was obtained through in-depth semi-structured interviews. Participants reported that domestic violence is a serious issue in the study area and 60% believed that it may not be justifiable. Eighteen participants identified husbands as main instigators of domestic violence. Participants thought that violence could have far-reaching effects. The importance of this paper for my research cannot be overemphasized. It formed the very basis of my argument that the Domestic Violence Law passed in Ghana, indeed affected women's perception of wife-beating.

- 4. Desai, S., & Alva, S. (1998). Maternal education and child health: Is there a strong causal relationship? *Demography*, 35(1), 71-81.**

Using data from the first round of Demographic and Health Surveys for 22 developing countries, they examined the effect of maternal education on three markers of child health: infant mortality, children's height-for-age and immunization status. Maternal education was found to have statistically significant impact on infant mortality and height-forage as well as children's immunization status in about one-half of the countries even after individual-level and community-

level controls are introduced. This material formed my basis for including maternal education in my model. I found similar results.

5. **Duflo, E., & Udry, C. (2004). *Intrahousehold resource allocation in Cote d'Ivoire: Social norms, separate accounts and consumption choices*. National Bureau of Economics Research, NBER Working Paper No. 10498**

They study resource allocation within households in Côte d'Ivoire. In Côte d'Ivoire, as in much of Africa, husbands and wives farm separate plots, and there is some specialization by gender in the crops that are grown. These different crops are differentially sensitive to particular kinds of rainfall shocks. They found that conditional on overall levels of expenditure, the composition of household expenditure is sensitive to the gender of the recipient of a rainfall shock. For example, rainfall shocks associated with high yields of women's crops shift expenditures toward food. Strong social norms constrain the use of profits from yam cultivation, which is carried out almost exclusively by men. In line with these norms, they found that rainfall-induced fluctuations in income from yams are transmitted to expenditures on education and food, not to expenditures on private goods (like alcohol and tobacco). These ideas were helpful in shaping my thoughts about a possible instrument for my paper. A good instrument should be correlated with the explanatory variable but not the dependent variable. And this is what Duflo et al demonstrated.

6. **Fantahun, M., Berhane, Y., Wall, S., Byass, P., & Högberg, U. (2007). *Women's involvement in household decision-making and strengthening social capital—crucial factors for child survival in Ethiopia*. *Acta paediatrica*, 96(4), 582-589.**

They found that combined efforts to improve women's involvement in household decision making, social capital and immunization may decrease the high child mortality in this setting, where the level of poverty is high and no appreciable trend in child mortality decline has been noted over the years.

This was very fundamental in providing theoretical support for the policy recommendations made in my paper

7. **Kishor, S. (2000). Empowerment of women in Egypt and links to the survival and health of their infants. *IN Women's Empowerment and Demographic Processes*, Oxford University Press, New York, NY, USA, 2000 <http://www.africabib.org/rec.php?RID=W00080979>**

This paper provided me with an insightful revelation of how empowering women can both directly and indirectly improve child health outcomes. These were the basic foundations on which my theoretical models of household bargaining and child health were built. To spice it up, it used a similar dataset from an African country, making it easier to replicate and extend the arguments to my case.

8. **Lépine, A., & Strobl, E. (2013). The effect of women's bargaining power on child nutrition in rural Senegal. *World Development*, 45, 17-30.**

This study examined how women's bargaining power affects child nutritional status using data from rural Senegal. In order to correct for the potential endogeneity of women's bargaining power they used information on a mother's ethnicity relative to that of the community in which she resides in order to construct an arguably exogenous exclusion restriction. While standard OLS estimates suggest that if a mother has more bargaining power, her children will have a better nutritional status, their "instrumental variable" estimates indicate that the true impact is underestimated if the endogeneity of bargaining power is not taken into account. This paper helped me address the endogenous nature of the relationship I was trying to model and helped me to address these endogeneity problems

9. **Li, L., & Wu, X. (2011). Gender of children, bargaining power, and intrahousehold resource allocation in China. *Journal of Human Resources*, 46(2), 295-316.**

They argued that having a male child in China was associated with higher bargaining power for women due to the one-child policy. Their argument was extended to my paper in making a case for endogeneity.

Specifically, I also found, consistent with the norms in Ghana, that women who did not have male children or had female children were less likely to have bargaining power.

- 11 Ueyama, M. (2006). **Effects of Women's Agriculture on Child Health in Rural Malawi: "Food Security Effect" and "Bargaining Effect."** *Conference Paper, Center for the Study of African Economics* <http://www.csae.ox.ac.uk/conferences/2006-eoi-rpi/papers/csae/ueyama.pdf>

This paper empirically investigated how mother's bargaining power influences children's health in rural Malawi, by the distinction among three mechanisms through which women's roles in agriculture could improve health outcomes of the children, (1) the "pure bargaining effect," (2) the "pure food security effect," and (3) the "bargaining effect through household food security." The results suggest that women's contribution to food production has a positive effect on child health through enhancing women's bargaining power within a household. In particular, an increase in women's bargaining power leads to an improvement on girls' health condition relative to boys' health, similar to the evidence from existing studies. This literature was highly relevant to my paper. It formed part of the huge body of literature that lends empirical credence to my paper's findings.

- 12 Quisumbing, A. R., & Maluccio, J. A. (2000). ***Intrahousehold allocation and gender relations: New empirical evidence from four developing countries***: International Food Policy Research Institute, FCND Discussion Paper No. 84 Washington, D.C.

The paper reviewed recent theory and empirical evidence testing unitary versus collective models of the household. Using new household data sets from Bangladesh, Indonesia, Ethiopia, and South Africa, they present measures of individual characteristics that are highly correlated with bargaining power, namely human capital and individually-controlled assets, evaluated at

the time of marriage. In all country case studies they rejected the unitary model as a description of household behavior, but to different degrees. Results suggest that assets controlled by women have a positive and significant effect on expenditure allocations toward the next generation, such as education and children's clothing. Similarly, I also examined individual-level education outcomes and find that parents do not have identical preferences toward sons and daughters within or across countries. This paper was of two broad significances. It thus provided empirical support to my argument that households do not make joint decisions. It is on this basis that I segregated household bargaining outcomes into two: father alone or mother alone. It also provided theoretical support for my women empowerment argument.

USE OF LIBRARY AND/ RESOURCE NARRATIVE

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Title of Entry: Intra-household Bargaining, Domestic Violence and Child Health Investment in Ghana

RESOURCE NARRATIVE

On the first day of my ECN 5403, Research Methods in Economics class, my professor told me that only a research paper was required for the class; **no midterm exam, no finals**. Such was how vital the research paper was. As usual with research, deciding on a unique topic was a difficult challenge. To help me, Dr. Upadhyay taught me how to utilize EIU's The Keep Online Repository to see past student research works as a guide for my paper. The diversity in the research articles available in The Keep was instrumental in producing a paper that would be accepted for a fully funded trip to Finland this summer for presentation at the United Nations University Development Conference on Human Capital and Growth.

Specifically, the paper "*A Retrospective Study of the Link between Maternal Social Anxiety and College-Student Social Anxiety: Mediating the Role of Maternal Cognitions & Behaviors*" by Kyung Won Kim, a 2014 psychology graduate gave me an idea of what I could do. But since the paper was written in the context of psychology and did not have much of an econometric foundation, replicating the study in economics was nothing less than a tough challenge.

However, in the weeks that followed, with the help of the Booth Library Reference Desk, I found books on maternal and child outcomes as well as domestic violence and women empowerment. With the ideas obtained, I decided to investigate the impact of domestic violence and women empowerment on child health, guided by the idea of Won Kim which I found in The Keep. It is the novelty of this idea from psychology and the use of domestic violence laws as an instrumental variable for the first time in the economics literature that made my paper unique. In the process of writing the literature review, however, accessing literature for my paper became a difficult task, as most of the online publishers like Elsevier required me to purchase the articles. My mentor then suggested using the search button on the Booth

Library website, which allowed me free access to a lot of articles, through the JSTOR, LEXIS-NEXIS digital libraries and the interlibrary loan facility **free of charge**. Based on the articles I retrieved through Booth Library, 12 of which I cited in my paper, I built my model and tested the implications of my model using survey data on 4,916 households in Ghana from the USAID Demographic and Health Surveys.

Thanks to Booth Library, the paper was successfully written and has since being accepted for presentation at this year's United Nations University-World Institute for Development Economics Research (UNU-WIDER) Conference in Finland. It has also been awarded the College of Science Student Investigator Award for 2016 and will also be presented at this year's Midwest Economics Association Conference.

Thank you, Booth Library! Without you, this wouldn't have been possible!