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**Gender Empowerment Gaps in Agriculture and
Children's Well-Being in Bangladesh**

Hazel Jean L. Malapit

Esha Sraboni

Agnes R. Quisumbing

Akhter Ahmed

Poverty, Health, and Nutrition Division

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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AUTHORS

Hazel Jean L. Malapit (h.malapit@cgiar.org) is a research coordinator in the Poverty, Health, and Nutrition Division of the International Food Policy Research Institute (IFPRI), Washington, DC.

Esha Sraboni is a PhD candidate in the Department of Sociology at Brown University, Providence, RI, US.

Agnes R. Quisumbing is a senior research fellow in the Poverty, Health, and Nutrition Division of IFPRI, Washington, DC.

Akhter Ahmed is a senior research fellow/chief of party, PRSSP in the Poverty, Health, and Nutrition Division of IFPRI, Dhaka, Bangladesh.

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ABSTRACT

Development programs that reduce gender gaps are expected to not only improve women's well-being, but also their children's. This draws on a growing body of literature that shows a strong positive association between women's status and control over resources and improvements in children's outcomes, particularly nutrition and education. In this paper, we provide empirical evidence on the relationship between empowerment gaps between men and women in the same household and children's well-being using nationally representative data from the 2012 Bangladesh Integrated Household Survey (BIHS). We measure children's well-being using nutritional status for younger children (ages 0–5) and education outcomes for older children (ages 6–10 and 11–17). We measure relative empowerment using direct measures of empowerment collected from men and women in the same households using the Women's Empowerment in Agriculture Index. Our findings suggest that gender gaps in empowerment are only weakly linked to children's nutrition, although different measures of empowerment reveal significant differences between boys' and girls' outcomes, depending on the measures used. Overall, the household head's (father's) education is significantly associated with better nutrition and education outcomes for children, but younger girls (ages 6–10) and older boys and girls (ages 11–17) are more likely to receive more education when mothers are more educated. Our results on parental education suggest that fathers' empowerment may be reflecting a "wealth" effect that is invested in children's nutrition and education when they are young, while mothers' empowerment becomes more important in girls' education in general and keeping older children, regardless of sex, in school.

Keywords: women's empowerment; gender; nutrition; education; Bangladesh

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1. INTRODUCTION

A growing body of literature documents a strong positive association between women's status and control over resources and improvements in children's outcomes, particularly nutrition and education (Quisumbing and Maluccio 2003; Bhagowalia et al. 2012; Allendorf 2007; Skoufias 2005; Ackerson and Subramanian 2008; Smith et al. 2003; Shroff et al. 2011; van den Bold, Quisumbing, and Gillespie 2013; Cunningham et al. 2015). Findings from this literature have been used to recommend programs that reduce gender gaps, on the grounds that this will improve women's well-being as well as their children's. Although much of the existing evidence is associational, and could be partly due to assortative mating and unobservable factors (Duflo 2012), a systematic review based on rigorous impact evaluations found that targeting cash transfers toward women through conditional cash transfer programs and pensions appears to improve child nutrition and health (Yoong, Rabinovich, and Diepeveen 2012). However, because none of these studies explored the counterfactual, it remains unknown whether targeting transfers to women improves household welfare more than targeting transfers to men does.

Another strand of the literature expands the definition of empowerment beyond control over resources. Kabeer (1999) defines empowerment as expanding people's ability to make strategic life choices, particularly in contexts in which this ability had been denied to them. Measurement of empowerment, however, has proved elusive. Many studies have focused on simple proxy measures of empowerment such as education and wealth. More recent studies have analyzed more direct measures of empowerment, such as indicators related to decisionmaking power (Allendorf 2007; Shroff et al. 2011; Bhagowalia et al. 2012) and domestic violence (Ackerson and Subramanian 2008; Bhagowalia et al. 2012; Asling-Monemi et al. 2003; Asling-Monemi, Tabassum Naved, and Persson 2008). However, these studies typically focus on women's empowerment in the domestic sphere. Relatively few studies attempt to measure empowerment in the economic sphere, particularly in the agricultural sector where the majority of poor people in developing countries make their living (Malapit and Quisumbing 2015; Malapit et al. 2015). In addition, empowerment is a multidimensional concept. A comparison of empowerment measures across a range of domains within and beyond agriculture would help identify the key dimensions that facilitate investments in the next generation.

Lastly, many of these studies collect information from women only and cannot be used to measure gender empowerment gaps within the household. Considerable empirical evidence exists supporting the collective model of the household, in which individuals do not necessarily pool resources or share the same preferences (Haddad, Hoddinott, and Alderman 1997; Behrman 1997). Having similar—if not identical—information on male and female decisionmakers within the same household is important in understanding how intrahousehold gender gaps affect household decisions. In households where both men and women make decisions on children's well-being, both men's and women's empowerment may be important determinants of child well-being.

In this paper, we provide empirical evidence on the relationship between relative empowerment between men and women in the same household and children's nutrition and education outcomes in a household bargaining framework using nationally representative data from the 2012 Bangladesh Integrated Household Survey (BIHS). Our primary goal is to understand to what extent empowerment gaps between men and women within the household are associated with children's well-being, and whether these gender inequalities have differential effects on boys and girls. We measure empowerment in agriculture using a recently developed survey-based index called the Women's Empowerment in Agriculture Index (WEAI), which assesses women's empowerment in five domains in agriculture: decisionmaking over production, ownership and decisionmaking over resources, control over use of income, leadership in the community, and time use (Alkire et al. 2013). The WEAI collects the same information for both the primary male and the primary female decisionmakers in the household, which can then be used to construct measures of intrahousehold disparities.

2. CONCEPTUAL FRAMEWORK

To understand whether and in what way women's empowerment in agriculture is relevant to investments in children's well-being outcomes in rural Bangladesh, we begin with a model of household decisionmaking in an agricultural household. We assume a collective agricultural household composed of a principal male and a principal female decisionmaker who may have different endowments, constraints, and preferences. This is in line with the extensive empirical evidence rejecting a unitary model of the household that assumes all household members have the same preferences and all household resources are pooled (see Alderman et al. 1995; Haddad, Hoddinott, and Alderman 1997; Behrman 1997; Strauss, Mwabu, and Beegle 2000; Quisumbing 2003 for reviews). Men and women may own or control different productive resources, have access to different types of technologies, or have skills in different types of production tasks or activities. They may also be bound by gender-based constraints that define the extent of their participation in agriculture and other livelihood activities, resulting in differences in the types of investments that men and women can make toward children's well-being outcomes. Gender norms may also result in different preferences between men and women for what types of food to consume and how to distribute food among household members, when and how to seek healthcare, and whether to send children to school and for how long. These gender-based differences imply that decisions on what and how to produce, as well as decisions on the intrahousehold allocation of food, health, and other goods, are influenced by the relative bargaining power of men and women in the household.

The demand function for children's well-being can be derived from a collective agricultural household, similar to what is described above, augmented to include a production function for children's well-being and children's well-being in the utility function (Quisumbing and Maluccio 2003). The reduced form of the demand for children's well-being can then be expressed as some function of relative bargaining power as follows:

$$\mathbf{c}_i = f_i(\mu(a_m, a_f), \mathbf{I}, \mathbf{H}), \quad (1)$$

where \mathbf{c}_i is a vector of children's well-being outcomes, including nutritional status and education; μ represents the relative bargaining strength of individuals, which is a function of proxy measures of male and female bargaining power (a_m and a_f , respectively); \mathbf{I} is a vector of individual characteristics, such as sex, age, and age squared; and \mathbf{H} is a vector of household characteristics, such as household size and composition, and other controls. The effects of individual bargaining power on children's outcomes are given by: $\partial \mathbf{c}_i / \partial a_j$, with $j = m, f$. This formulation also provides a straightforward test of the unitary model, which implies that the identity of the person in control over the resources is irrelevant, and $\partial \mathbf{c}_i / \partial a_j = 0$, with $j = m, f$ (Quisumbing and Maluccio 2003).

A variety of proxies for bargaining power have been used in the literature, including: (1) shares of income earned by women (Hoddinott and Haddad 1995); (2) unearned income (Thomas 1990; Schultz 1990); (3) current assets (Doss 1996); (4) inherited assets (Quisumbing 1994); (5) assets at marriage (Thomas, Contreras, and Frankenberg 1999); (6) the public provision of resources to specific household members (Lundberg, Pollak, and Wales 1997; Rubalcava and Thomas 2000); and more recently, (7) interventions that provide transfers or increase resources to women (see the extensive review in Yoong, Rabinovich, and Diepeveen 2012). Although the concept of empowerment is much broader than bargaining power, emphasizing the process of expanding agency and spanning multiple dimensions (Kabeer 1999; Malhotra and Schuler 2005; Ibrahim and Alkire 2007; Alkire et al. 2013; van den Bold, Quisumbing, and Gillespie 2013), many of the same indicators used to measure bargaining power, such as control over resources and say in household decisions, are also used to measure empowerment. For the purpose of this paper, which investigates household investments on children empirically, greater empowerment implies greater bargaining power, and vice versa.

We use several measures of bargaining power in this paper. First, following Quisumbing and Maluccio (2003), we use human resources brought to the marriage, including age and education, as measures of individual bargaining power. Individuals with greater human resources are more likely to

command a larger share of household resources, and therefore household decisions are more likely to reflect their personal preferences. Human capital is a useful indicator of bargaining power because it reflects the empowerment of individuals more broadly, extending beyond the productive sphere. Although human capital may be endogenous to the result of marriage market selection or other unobservable characteristics, the timing of decisions is such that these are taken as given and therefore exogenous to decisions undertaken *within* the marriage (Quisumbing and Maluccio 2003).

Second, we use the WEAI as our measure of empowerment in the productive sphere. The WEAI is an aggregate index based on the Alkire-Foster methodology for multidimensional indices (Alkire and Foster 2011b; Alkire and Foster 2011a). The WEAI survey instrument collects individual-level data from primary male and primary female decisionmakers within the same households. It measures the extent of individuals' engagement in the agricultural sector in five domains: (1) decisions over agricultural production, (2) access to and decisionmaking power over productive resources, (3) control over use of income, (4) leadership in the community, and (5) time use. The five domains are weighted equally, and are measured by ten binary indicators, which are also weighted equally within each domain (Table 2.1). "Adequate achievement" for each indicator means that a person has surpassed a given threshold (0=inadequate, 1=adequate), and the weighted sum of the ten indicators comprises a person's empowerment score. More information on the methodology, piloting, and validation of the WEAI is available at Alkire et al. (2013). In this paper, we use the individual-level empowerment scores and component indicators of primary male and primary female respondents to investigate the relationship between relative empowerment in agriculture and children's well-being. This enables us to assess whether gender empowerment gaps in agriculture exert any additional influence on children's well-being outcomes after controlling for relative bargaining power as proxied by human resources brought to the marriage.

Table 2.1 The five domains of empowerment in the WEAI

Domain	Indicator	Definition of indicator	Weight
Production	Input in productive decisions	Sole or joint decisionmaking over food and cash-crop farming, livestock, and fisheries	1/10
	Autonomy in production	Autonomy in agricultural production (for example, which inputs to buy, crops to grow, livestock to raise). Reflects the extent to which the respondent's motivation for decisionmaking reflects his/her values rather than a desire to please others or avoid harm.	1/10
Resources	Ownership of assets	Sole or joint ownership of major household assets	1/15
	Purchase, sale, or transfer of assets	Whether respondent participates in decision to buy, sell, or transfer his/her owned assets	1/15
	Access to and decisions on credit	Access to and participation in decisionmaking concerning credit	1/15
Income	Control over use of income	Sole or joint control over income and expenditures	1/5
Leadership	Group member	Whether respondent is an active member in at least one economic or social group (for example, agricultural marketing, credit, water users' groups)	1/10
	Speaking in public	Whether the respondent is comfortable speaking in public concerning various issues, such as intervening in a family dispute, ensuring proper payment of wages for public work programs.	1/10
Time	Workload	Allocation of time to productive and domestic tasks	1/10
	Leisure	Satisfaction with the available time for leisure activities	1/10

Source: Alkire et al. (2013).

Finally, we examine other possible empowerment proxies, such as respondents' self-assessments as to their degree of influence in the community (9-point scale) and their overall life satisfaction (10-point scale). These subjective assessments reflect individuals' perceived empowerment in the community and their overall ability to make strategic life decisions, which is central to Kabeer's (1999) definition of empowerment. These variables are similar to those included in surveys like the Gallup World Poll (www.gallupworldpoll.com) and the World Values Survey (www.worldvaluessurvey.org).

3. EMPIRICAL SPECIFICATION, DATA AND VARIABLES

Empirical Specification

We estimate children's well-being outcomes as a function of child characteristics and relative bargaining power using equation (1) expressed as a linear function:

$$\begin{aligned} C_{ij} = & \beta_0 + \beta_1 (A_{mj} - A_{fj}) + \beta_2 (E_{mj} - E_{fj}) + \beta_3 G_{ij} \\ & + \beta_4 ((A_{mj} - A_{fj}) \times G_{ij}) + \beta_5 ((E_{mj} - E_{fj}) \times G_{ij}) \\ & + \beta_6 I_{ij} + \beta_7 H_j + \varepsilon_{ij}, \end{aligned} \quad (2)$$

where C_{ij} is a vector of well-being outcomes for child i in household j , including height-for-age (HAZ), weight-for-height (WHZ), and weight-for-age (WAZ) z-scores, and education measured as deviations from cohort means; $(A_m - A_f)$ represents the difference in the husband's and wife's human capital; $(E_{mj} - E_{fj})$ represents the difference in husband's and wife's empowerment measure; G_{ij} is an indicator variable equal to one if the child is a girl; I_{ij} is a vector of child characteristics; H_j is a vector of household characteristics and other controls; β_k are parameters to be estimated; and ε_{ij} is an error term. Our key coefficients of interest are β_2 for boys and $(\beta_2 + \beta_5)$ for girls, which reflect the relationship between the outcome variable and relative empowerment, controlling for other proxy measures of relative bargaining power and relevant individual and household characteristics.

One possible source of bias in estimating equation (2) is the potential endogeneity of empowerment. That is, empowerment is likely to be affected by the very same factors that influence children's nutrition and education. As in our earlier work using the BIHS (Sraboni et al. 2014), we estimate equation (2) using ordinary least squares regression (OLS) as well as standard instrumental variables (IV) techniques to correct for potential endogeneity bias.

Data

We use data from the Bangladesh Integrated Household Survey (BIHS) (A. Ahmed 2013), which is nationally representative of rural areas in the seven administrative divisions of the country. The survey was conducted from December 2011 to March 2012, a busy agricultural season for men but not women, who are mainly involved in postharvest activities. The BIHS consists of 1,608 nonfarm and 3,895 farm households, and includes a wide range of information on household demographics, education, employment, food and nonfood consumption and expenditures, agricultural production and livestock holding, and individual anthropometric measurements, as well as separate WEAI modules for self-identified primary male and female decisionmakers, interviewed separately and in private.

Because the WEAI measures empowerment in the agricultural sector, we restrict our analysis to the 3,895 farm households, including households relying on agricultural wage labor. This prevents the potential misclassification of individuals as disempowered when they do not participate in agricultural activities. In line with our conceptual framework where household decisionmakers negotiate with each other on how to allocate household resources, we need a measure for the relative strengths of individual bargaining power for men and women within the same household. Thus, we restrict our estimation samples to 3,213 households with valid WEAI responses from *both* the primary male and female decisionmakers. Of these households, our final estimation samples include 3,156 households with 1,774 co-resident children aged 0–5 years old, 2,308 co-resident children aged 6–10 years old, and 1,911 co-resident children aged 11–17 years old. Summary statistics of all the variables used are presented in Table 3.1.

Table 3.1 Summary statistics

Variable	Obs	Mean	Std. Dev.	Min.	Max.
<i>Nutrition outcomes, children under 5 years</i>					
Height-for-age z-scores (HAZ)	1756	-1.84	1.45	-5.97	5.35
Boys	863	-1.87	1.51	-5.87	5.35
Girls	893	-1.81	1.40	-5.97	4.33
Weight-for-height z-scores (WHZ)	1753	-0.77	1.19	-4.94	3.07
Boys	861	-0.73	1.20	-4.89	3.07
Girls	892	-0.81	1.17	-4.94	2.63
Weight-for-age z-scores (WAZ)	1774	-1.60	1.08	-4.97	2.17
Boys	873	-1.57	1.10	-4.97	2.17
Girls	901	-1.62	1.07	-4.87	1.67
Stunted	1756	0.47	0.50	0	1
Boys	863	0.48	0.50	0	1
Girls	893	0.46	0.50	0	1
Wasted	1753	0.13	0.33	0	1
Boys	861	0.12	0.33	0	1
Girls	892	0.13	0.34	0	1
Underweight	1774	0.34	0.47	0	1
Boys	873	0.32	0.47	0	1
Girls	901	0.36	0.48	0	1
<i>Education outcomes, children 6–10 years</i>					
Education, deviation from cohort means	2308	0.00	0.81	-2	4
Boys	1165	-0.05	0.82	-2	3
Girls	1143	0.04	0.79	-2	4
Years of education	2308	0.92	1.13	0	6
Boys	1165	0.86	1.12	0	5
Girls	1143	0.98	1.14	0	6
<i>Education outcomes, children 11–17 years</i>					
Education, deviation from cohort means	1911	0.05	1.91	-6	5
Boys	957	-0.30	2.01	-6	5
Girls	954	0.38	1.75	-6	4
Years of education	1911	4.52	2.26	0	10
Boys	957	4.16	2.29	0	10
Girls	954	4.86	2.18	0	10

Table 3.1 Continued

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std dev</i>	<i>Min</i>	<i>Max</i>
<i>Individual characteristics</i>					
<i>Children under 5 years</i>					
Age under 2 (=1, 0 otherwise)	1774	0.42	0.49	0	1
Age (months)	1774	28.83	17.04	0	61
Female (=1, 0 otherwise)	1774	0.52	0.50	0	1
Child of WEAI respondent (=1, 0 otherwise)	1774	0.82	0.39	0	1
<i>Children aged 6–10 years</i>					
Age (years)	2,308	8.11	1.45	6	10
Female (=1, 0 otherwise)	2,308	0.50	0.50	0	1
Child of WEAI respondent (=1, 0 otherwise)	2,308	0.89	0.31	0	1
<i>Children aged 11–17 years</i>					
Age (years)	1,911	12.95	1.37	11	15
Female (=1, 0 otherwise)	1,911	0.51	0.50	0	1
Child of WEAI respondent (=1, 0 otherwise)	1,911	0.92	0.26	0	1
<i>Human resources brought to marriage</i>					
Age of woman	3156	35.51	10.35	17	80
Age of man (household head)	3156	43.60	11.99	20	95
Difference in age (man-woman)	3156	8.08	4.52	-15	40
Years of education of woman	3156	3.07	3.46	0	16
Years of education of man (household head)	3156	3.06	3.88	0	16
Difference in years of education (man-woman)	3156	-0.01	3.27	-11	14
<i>Empowerment variables</i>					
Empowerment score of man	3156	0.80	0.19	0.27	1.00
Empowerment score of woman	3156	0.65	0.24	0.07	1.00
Difference in empowerment score (man-woman)	3156	0.15	0.26	-0.57	0.90
Number of groups man is an active member of	3156	0.16	0.43	0	5
Number of groups woman is an active member of	3156	0.34	0.50	0	3
Difference in number of groups (man-woman)	3156	-0.18	0.63	-3	5
Average number of decisions over credit, made by man	3156	1.28	0.95	0	2
Average number of decisions over credit, made by woman	3156	0.99	0.98	0	2
Difference in average numbers of decisions over credit (man-woman)	3156	0.29	0.97	-2	2
Number of assets man has self/joint ownership of	3156	21.71	9.51	0	53
Number of assets woman has self/joint ownership of	3156	11.12	9.46	0	48
Difference in number of assets owned (man-woman)	3156	10.59	10.40	-28	45
Number of self/joint decisions over purchase, sale, or transfer of assets made by man	3156	5.20	2.38	0	14
Number of self/joint decisions over purchase, sale, or transfer of assets made by woman	3156	1.86	1.44	0	8
Difference in number of decisions over purchase (man-woman)	3156	3.34	2.47	-5	11

Table 3.1 Continued

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std dev</i>	<i>Min</i>	<i>Max</i>
<i>Empowerment variables (continued)</i>					
Ladder score of man	3156	3.28	1.67	1	9
Ladder score of woman	3156	2.66	1.35	1	9
Difference in ladder score (man-woman)	3156	0.62	1.83	-8	7
Satisfaction score of man	3156	6.40	2.11	1	10
Satisfaction score of woman	3156	6.12	2.15	1	10
Difference in satisfaction score (man-woman)	3156	0.27	2.72	-9	9
<i>Household characteristics</i>					
Household head is farmer (=1, 0 otherwise)	3156	0.25	0.44	0	1
Household head is trader (=1, 0 otherwise)	3156	0.12	0.33	0	1
Household size	3156	5.08	1.71	3	17
Proportion of males 0–4 years old	3156	0.06	0.11	0	0.60
Proportion of males 5–10 years old	3156	0.09	0.12	0	0.60
Proportion of males 11–18 years old	3156	0.08	0.13	0	0.67
Proportion of males 19–59 years old	3156	0.23	0.10	0	0.67
Proportion of males 60 years and older	3156	0.03	0.08	0	0.33
Proportion of females 0–4 years old	3156	0.06	0.11	0	0.60
Proportion of females 5–10 years old	3156	0.09	0.12	0	0.50
Proportion of females 11–18 years old	3156	0.08	0.12	0	0.60
Proportion of females 19–59 years old	3156	0.25	0.08	0	0.60
Proportion of females 60 years and older	3156	0.02	0.06	0	0.33
Number of dairy cows owned	3156	0.71	1.21	0	9
Price of rice (in taka)	3156	30.19	3.52	20	55
Cultivable land owned by household (in decimals)	3156	11.00	45.44	0	936
Ln (owned cultivable land+1)	3156	0.60	1.43	0	6.84
Access to electricity (=1, 0 otherwise)	3156	0.47	0.50	0	1
Division dummy 1	3156	0.05	0.23	0	1
Division dummy 2	3156	0.15	0.35	0	1
Division dummy 3	3156	0.30	0.46	0	1
Division dummy 4	3156	0.12	0.32	0	1
Division dummy 5	3156	0.17	0.38	0	1
Division dummy 6	3156	0.14	0.35	0	1
Division dummy 7	3156	0.07	0.26	0	1
<i>Instruments</i>					
Types of informal credit sources in village	3156	2.37	1.48	0	5
Years of operation of oldest NGO in village	3156	17.75	7.96	0	40
Number of community activities woman has participated in last year	3156	0.85	1.17	0	7
Amount of land inherited by woman (in acres)	3156	0.00	0.05	0	1.7
Whether woman co-resides with mother-in-law (=1, 0 otherwise)	3156	0.13	0.34	0	1

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Dependent Variables

The available measures of children's well-being differ across age groups. We focus on nutritional status for younger children and education for older children.

Nutritional Status

For children under five years old, we use anthropometric height and weight information used to construct height-for-age (HAZ) and weight-for-height (WHZ) z-scores. Low HAZ is an indication of chronic malnutrition (shortness), low WHZ is an indication of acute malnutrition (thinness), and low WAZ indicates a combination of both chronic and acute malnutrition. HAZ and WHZ are often used as indicators of long-term and short-term nutritional status, respectively. Child anthropometric indicators show high rates of malnutrition in rural Bangladesh, similar to previous studies (NIPORT et al. 2013; T. Ahmed et al. 2012). Close to half of under-five children are stunted (47 percent), and over a third are underweight (34 percent) (Table 3.1).

Education

Following Quisumbing and Maluccio (2003), we measure education as the deviation of each child's completed years of schooling from the average completed years of schooling of other children of the same age (in years). Unlike years of schooling, this measure prevents censoring owing to unfinished schooling, and shows how well each child is doing relative to other children of the same age. We analyze education outcomes for two groups of co-resident children: primary school-age children (ages 6–10 years old) and secondary school-age children (ages 11–17 years old). On average, girls tended to do better than their cohort, while boys tended to do worse. When schooling is measured in both years and in cohort-deviations, girls significantly outperform boys (Table 3.1), consistent with the higher school attendance for girls found in the 2011 Bangladesh Demographic and Health Survey (NIPORT 2013). Regressions using completed years of schooling as the dependent variable produced similar results and are not reported.

Key Independent Variables

We measure relative bargaining power in two ways, first using human resources brought to marriage, and then using empowerment measures collected as part of the WEAI.

Human Resources Brought to Marriage

Following Quisumbing and Maluccio (2003), we interpret the husband and wife's age and education as human capital brought to the marriage. We construct these as male-female differences in age and years of schooling, to facilitate comparisons with our relative empowerment measures. Quisumbing and Hallman (2006) discuss how husband age and education seniority have often been used in empirical studies to connote male control over women (e.g., Miller 1981; Cain 1984). Education differences can be viewed as a proxy for differences in earning power, which carries bargaining power (Sen 1989). For example, the measure used by Smith et al. (2003) of women's decisionmaking power relative to their male partners is based on four underlying indicators: whether a woman works for cash; her age at first marriage; the age difference between her and her husband; and the education difference between her and her husband. Individuals with greater human resources are more likely to control a larger share of household resources, and therefore, household decisions are more likely to reflect their personal preferences. Human capital also indicates the empowerment of individuals more broadly, extending beyond the productive sphere. Although human capital may be endogenous to the result of marriage market selection or other unobservable characteristics, the timing of decisions is such that these are taken as given (most husbands and wives in our sample do not continue schooling after marriage) and therefore are exogenous to decisions undertaken *within* the marriage (Quisumbing and Maluccio 2003). Married women in our

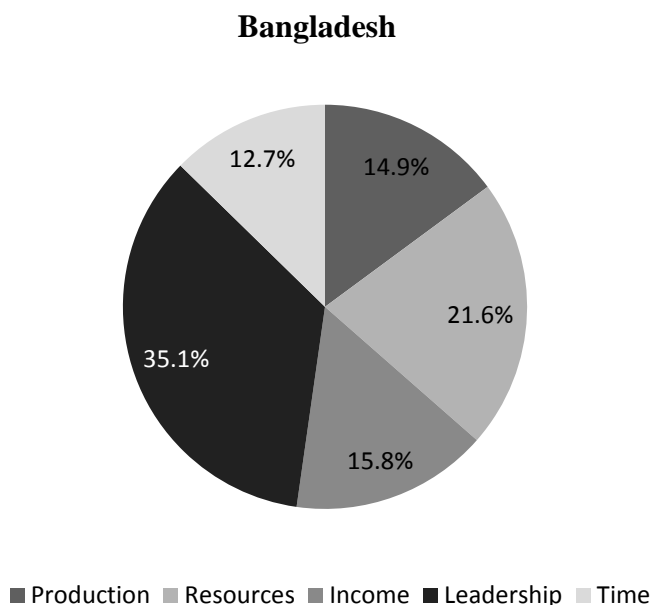
sample are 36 years old on average, eight years younger than their spouses (Table 3.1). Both men and women have low levels of education, averaging about three years of schooling for both men and women.

Empowerment Measures

The WEAI measures empowerment in agriculture across five domains and ten indicators, all weighted equally within each domain (Table 1.1). In line with other studies that have analyzed the WEAI (Sraboni, Quisumbing, and Ahmed 2013; Malapit and Quisumbing 2015; Malapit et al. 2015), we use the overall pattern of women’s disempowerment to guide our choice of empowerment indicators. First, we identify the key domains that contribute the most to disempowerment, and then within each key domain, identify the indicators that contribute the most to disempowerment. These are likely to be the areas that policymakers will target to improve women’s empowerment. Next, we construct a continuous measure of empowerment that draws on the underlying individual-level data for the identified indicators. Lastly, we construct a relative empowerment measure for each household by taking the difference between the male and female variables.

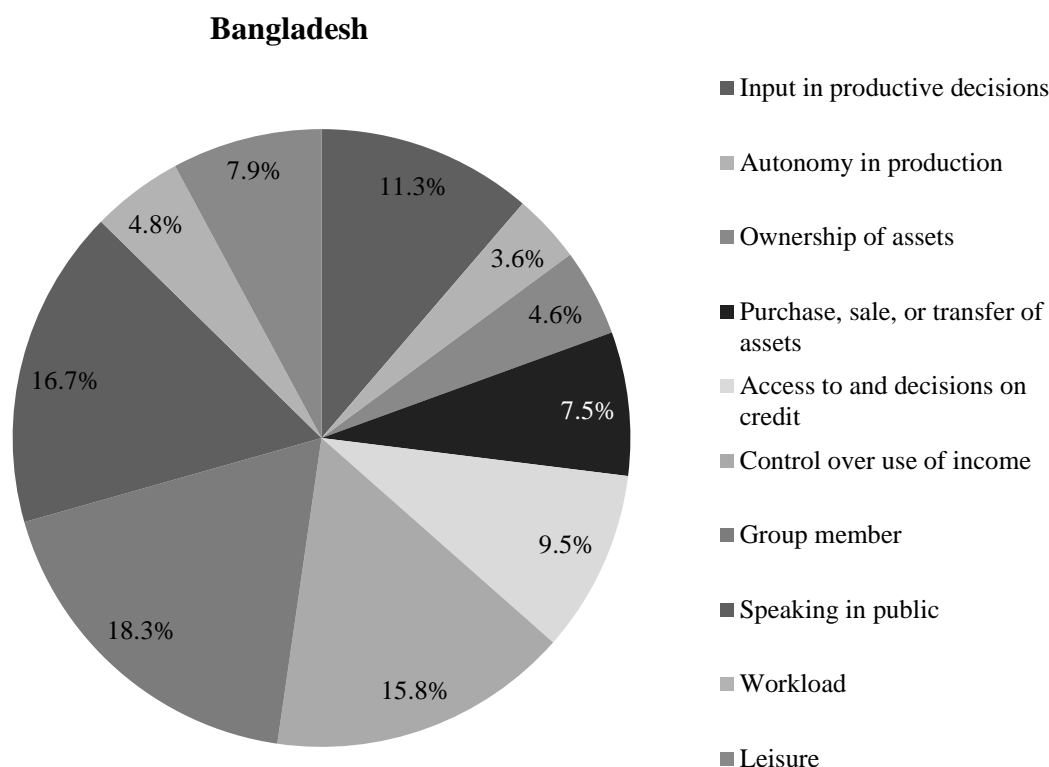
The technical report on the BIHS (Sraboni, Quisumbing, and Ahmed 2013) shows that the *leadership* and *resources* domains contribute the most to women’s disempowerment in rural Bangladesh (Figure 3.1). In addition, *group membership* contributes most to disempowerment in the leadership domain and *access to and decisions on credit* is the most critical indicator for the resources domain (Figure 3.2) (Sraboni, Quisumbing, and Ahmed 2013). However, the credit indicator may be problematic because the survey questions do not distinguish between non-borrowers who are truly credit constrained and those who have sufficient liquidity and therefore choose not to borrow (Sraboni et al. 2014). Following Sraboni et al. (2014), we also analyze the two other indicators for the resources domain, namely, *asset ownership* and *rights over assets*. Using this information, we use the alternative measures of relative empowerment listed below.

Figure 3.1 Contribution of each of the five domains to the disempowerment of women



Source: Sraboni, Quisumbing, and Ahmed (2013).

Figure 3.2 Contribution of each of the ten domain indicators to disempowerment of women



Source: Sraboni, Quisumbing, and Ahmed (2013).

- **Model 1: Empowerment score**

This is the difference between the individual-level empowerment scores of the primary male respondent and the primary female respondent in the household. Higher numbers indicate a larger gap between male and female empowerment, favoring males, and zero indicates perfect equality. The individual-level empowerment score is the weighted average of a person's achievements in the ten indicators that comprise the five domains of empowerment in agriculture, ranging from zero to one and increasing in empowerment. The empowerment score reflects overall empowerment in agricultural production. Men have higher empowerment scores than do women on average, which indicates that they are empowered in four out of five domains in agriculture (0.80), whereas women are empowered in only three out of five domains (0.65) (Table 3.1).

- **Model 2: (Leadership domain) group membership**

This is the male-female difference in the number of groups in which the respondents report being an active member. Active membership in more groups implies wider social networks and potentially greater empowerment. Unlike all the other empowerment indicators, which show that men outperform women, as indicated by the positive differences (Table 3.1), women show higher participation in groups, which may reflect the targeting of women in microcredit groups in rural Bangladesh.

- **Model 3: (Resources domain) credit decisions**
 This is the male-female difference in the number of credit decisions made solely or jointly by the respondents, averaged over the lending sources used. For every lending source, the respondent is asked who made the decision to borrow and who made the decision on how to use the money/item borrowed. In the absence of information on the size of the loans, we take the average number of decisions made across the five possible lending sources (nongovernmental organization [NGO], informal, formal, friends/family, and rotating savings and credit associations [ROSCAs]) so as not to assign greater empowerment to those who approach multiple types of lenders. On average, men make twice as many decisions on credit than women do in our sample (Table 3.1).
- **Model 4: (Resources domain) asset ownership**
 This is the male-female difference in the total number of asset types for which the respondent reports sole or joint ownership. Greater asset ownership implies greater access to resources and therefore higher empowerment. Men report owning twice as many types of assets as women do in our sample (Table 3.1), consistent with women's poor access to resources in Bangladesh (Quisumbing and Maluccio 2003).
- **Model 5: (Resources domain) rights over assets**
 This is the male-female difference in the number of sole or joint decisions made by respondents concerning the purchase/sale/transfer of assets, summed over all asset types. In the survey, the respondent is asked who can decide whether to sell, give away, mortgage/rent, and purchase each type of asset. Having more decisions over more asset types implies greater rights over assets and therefore higher empowerment. As expected, men are also more likely to make decisions regarding assets, as reflected by the higher number of self/joint decisions over assets made by men (22) compared to women (11) (Table 3.1).
- **Model 6: Ladder score**
 This is the male-female difference in the respondents' self-assessments regarding their degree of influence in the community (9-point scale). Higher scores indicate greater perceived influence. These subjective assessments reflect individuals' perceived empowerment in the community, and indicate empowerment beyond the productive sphere. In our sample, women are less likely to feel that they have some influence in the community, with lower average ladder scores (2.67) than men (3.30). However, both men and women have very low ladder scores on average (out of 9), suggesting that both men and women perceive a lack of empowerment in the community.
- **Model 7: Satisfaction score**
 This is the male-female difference in the respondents' self-assessments regarding their overall life satisfaction (10-point scale). Higher scores indicate greater life satisfaction. These subjective assessments reflect individuals' perceived ability to determine the course of their life, and indicate empowerment beyond the productive sphere. Men have higher life satisfaction scores on average compared with women, although the difference is small (Table 3.1).

Instrumental Variables

Appropriate instruments must be highly correlated with the relative empowerment of the husband and wife, but remain exogenous to the outcomes of interest, in this case, children's nutritional status and education. We use the same set of instruments for all the relative empowerment measures in our analysis. These include (1) the number of types of informal credit sources in the village, (2) the number of community activities the woman participated in during the previous year, (3) the years of operation of the oldest NGO in the community, (4) whether the wife's mother-in-law is present, and (5) whether the

homestead land has been inherited by the woman. These instruments are likely to be correlated with women's ability to exercise agency and negotiate with their husbands, and are exogenous to current period decisions regarding children's well-being.¹

Other Independent Variables

Our analysis also controls for child characteristics, household characteristics, and community characteristics. Child characteristics include (1) whether the child is under two years old, (2) age in months and its square, (3) whether the child is the biological offspring of the WEAI respondents, and (4) whether the child is female. Household characteristics include (1) age, (2) age squared and years of schooling of the household head (typically the self-identified primary male respondent), (3) whether the primary occupation of the household head is farmer or trader, (4) household size, (5) the age-sex composition of the household (with males aged 60 and above as the excluded category), (6) the natural logarithm of the area of cultivable land owned by the household, (7) the number of dairy cows owned by the household, and (8) whether the household has access to electricity. Community characteristics include the price of rice and division dummies to control for location-specific effects.

¹One of the reasons we use relative empowerment rather than including male and female empowerment separately as independent variables is that it is very difficult to find valid instruments for male empowerment.

4. RESULTS

We present key results for our OLS and IV estimates of HAZ, WHZ, and WAZ for children 0–5; education deviations for children 6–10; and education deviations for children 11–17 in Tables 4.1–4.5, respectively, and a summary of the results in Table 4.6. The IV diagnostics are reported at the end of each table. Given the set of instruments, if the null hypothesis of exogeneity cannot be rejected, then our discussion will focus on the preferred OLS specification. However, if the endogeneity test is rejected at the 10 percent level, then we discuss the IV estimates instead. Note that we cannot reject the null hypothesis that empowerment is exogenous, except in the following specifications: model 5 (asset decisions) in the WHZ regression (Table 4.2), models 4 and 7 (asset ownership and satisfaction score) in the age 6–10 education regression (Table 4.4), and model 2 (group membership) in the age 11–17 education regression (Table 4.5).

Children’s Nutritional Status

Children’s HAZ, WHZ, and WAZ appear to be only weakly correlated with relative bargaining power in the household (Tables 4.1–4.3, respectively). In the HAZ regressions (Table 4.1), none of the empowerment coefficients across the seven models are significant, except in the credit decisions specification (OLS model 3), where the relative empowerment coefficient for boys is insignificant, whereas the coefficient for girls is significant and negative. This implies that when credit decisionmaking favors the primary female respondent (smaller gender gap), girls are more likely to be taller than their reference age group.

In the WHZ regressions (Table 4.2), the strongest results are in the satisfaction score specification (OLS model 7), where a larger gender gap in the satisfaction score is negatively correlated with children’s weight-for-height, particularly for boys. This effect is smaller and less negative for girls. This implies that an increase in women’s life satisfaction increases boys’ weight-for-height, but less so for girls. In the group membership specification (OLS model 2), the gender gap in group membership is insignificant for boys, but has an unexpected weakly significant positive effect for girls. It appears that higher involvement by women relative to men may end up reducing girls’ WHZ, contrary to our expectations. The mechanism behind this result, which could point to excessive demands on women’s time owing to participation in group activities, or possible backlash from men within the household, needs to be better investigated. In the asset decisions specification (IV model 5), the coefficient of the gender gap in asset decisionmaking is positive and weakly significant for boys’ weight-for-height, and negative and significant for girls. This suggests that increasing the number of decisions made by women regarding assets, which in turn narrows the male-female gap in asset decisionmaking, is associated with better nutritional status for girls in the short run.

In the WAZ regressions (Table 4.3), the gender gap in group membership (OLS model 2) and satisfaction score (OLS model 7) are negative and significantly correlated with children’s weight-for-age. This implies that an increase in women’s participation in groups and life satisfaction relative to their husbands is likely to improve children’s WAZ. In the case of group membership, specifically, the results suggest that the effect is likely to favor boys rather than girls, perhaps reflecting the desire of mothers to invest in boys’ health.

Although gender gaps in human resources brought to marriage were insignificant in all the regressions, the education of the (male) household head is positive and highly significant in the HAZ and WAZ regressions (Tables 4.1 and 4.3, respectively). This may be reflecting a “wealth” effect, where households led by a well-educated head are also more likely to have sufficient resources to invest in children’s nutrition, at least as indicated by weight-based measures.

Table 4.1 Under-five children's height-for-age z-scores and measures of male-female difference in empowerment

Variable	Dependent variable: height-for-age z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Child characteristics														
=1 if female	-0.024	-0.157	-0.028	0.238	-0.007	-0.057	-0.051	-0.394	-0.045	-0.371	-0.049	0.023	-0.044	-0.103
	(0.213)	(0.273)	(0.211)	(0.383)	(0.210)	(0.233)	(0.234)	(0.547)	(0.223)	(0.434)	(0.212)	(0.228)	(0.209)	(0.239)
=1 if under 2 years old	-0.442***	-0.465***	-0.454***	-0.499***	-0.454***	-0.465***	-0.444***	-0.421***	-0.448***	-0.445***	-0.446***	-0.466***	-0.445***	-0.413***
	(0.155)	(0.156)	(0.155)	(0.167)	(0.155)	(0.157)	(0.154)	(0.161)	(0.155)	(0.156)	(0.155)	(0.157)	(0.155)	(0.160)
Age in months	-0.087***	-0.088***	-0.088***	-0.090***	-0.088***	-0.088***	-0.087***	-0.088***	-0.087***	-0.089***	-0.087***	-0.090***	-0.088***	-0.083***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.013)
Age in months squared	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
=1 if child of WEAI respondent	-0.117	-0.187	-0.124	-0.120	-0.127	-0.179	-0.130	-0.090	-0.131	-0.145	-0.139	-0.126	-0.132	-0.146
	(0.193)	(0.201)	(0.194)	(0.196)	(0.194)	(0.211)	(0.194)	(0.201)	(0.194)	(0.196)	(0.194)	(0.194)	(0.194)	(0.193)
Empowerment measures														
M-F difference in empowerment measure	-0.005	0.126	-0.097	-0.596	0.057	-0.266	0.005	0.039	-0.000	-0.008	-0.009	0.069	-0.011	-0.072
	(0.205)	(1.263)	(0.092)	(0.797)	(0.056)	(0.393)	(0.025)	(0.114)	(0.006)	(0.022)	(0.026)	(0.105)	(0.020)	(0.142)
M-F difference in age	-0.020	-0.019	-0.019	-0.017	-0.021	-0.016	-0.020	-0.017	-0.020	-0.019	-0.020	-0.023	-0.020	-0.017
	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)
M-F difference in education	0.001	0.001	0.001	0.009	-0.000	0.005	0.001	0.006	0.001	0.007	0.001	-0.003	0.001	0.006
	(0.019)	(0.021)	(0.019)	(0.021)	(0.019)	(0.020)	(0.020)	(0.022)	(0.020)	(0.022)	(0.019)	(0.020)	(0.019)	(0.020)
Interaction of child sex with empowerment measures														
FemaleXM-F difference in empowerment	-0.242	0.843	0.091	1.015	-0.166**	0.091	-0.001	0.098	-0.001	0.030	-0.008	-0.152	-0.010	0.210
	(0.270)	(1.721)	(0.119)	(1.003)	(0.075)	(0.528)	(0.032)	(0.159)	(0.007)	(0.039)	(0.037)	(0.140)	(0.026)	(0.263)
FemaleXM-F difference in age	0.002	-0.002	0.000	-0.009	0.002	-0.000	0.001	0.001	0.001	0.001	0.001	0.005	0.000	0.001
	(0.019)	(0.020)	(0.019)	(0.022)	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.018)	(0.019)	(0.020)
FemaleXM-F difference in education	-0.015	-0.020	-0.017	-0.022	-0.014	-0.017	-0.015	-0.016	-0.016	-0.023	-0.015	-0.007	-0.017	-0.017
	(0.023)	(0.025)	(0.023)	(0.024)	(0.023)	(0.024)	(0.023)	(0.026)	(0.023)	(0.025)	(0.023)	(0.024)	(0.023)	(0.024)

Table 4.1 Continued

Variable	Dependent variable: height-for-age z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<i>Household head characteristics</i>														
Age of household head	0.024 (0.021)	0.024 (0.022)	0.023 (0.021)	0.021 (0.023)	0.024 (0.021)	0.022 (0.021)	0.024 (0.021)	0.021 (0.021)	0.024 (0.021)	0.021 (0.022)	0.024 (0.021)	0.026 (0.021)	0.024 (0.021)	0.024 (0.021)
Age squared of household head	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Education of household head	0.047*** (0.013)	0.046*** (0.013)	0.048*** (0.013)	0.046*** (0.015)	0.048*** (0.013)	0.049*** (0.013)	0.047*** (0.013)	0.041*** (0.014)	0.047*** (0.013)	0.045*** (0.013)	0.048*** (0.013)	0.047*** (0.013)	0.048*** (0.013)	0.043*** (0.015)
N	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756	1,756
F	4.724	4.626	4.859	4.750	4.752	4.756	4.682	4.585	4.681	4.724	4.704	4.656	4.722	4.382
Hansen J p, Ho: instruments valid		0.774		0.769		0.719		0.751		0.737		0.795		0.827
Under ID test p, Ho: underidentified		0.000		0.007		0.041		0.000		0.001		0.000		0.327
Weak ID test stat (Kleibergen-Paap Wald F)		9.406		2.172		2.023		7.774		3.798		9.375		1.041
Anderson-Rubin, Ho: endogvars irrelevant														
A-R Wald test, p-value		0.794		0.794		0.794		0.794		0.794		0.794		0.794
A-R Wald Chi2 test, p-value		0.780		0.780		0.780		0.780		0.780		0.780		0.780
Endogeneity test p, Ho: exogenous		0.655		0.754		0.708		0.930		0.847		0.511		0.513

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Table 4.2 Under-five children's weight-for-height z-scores and measures of male-female difference in empowerment

Variable	Dependent variable: weight-for-height z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Child characteristics														
=1 if female	0.071 (0.169)	0.378 (0.235)	0.121 (0.169)	-0.307 (0.314)	0.059 (0.164)	0.327 (0.222)	0.152 (0.188)	0.865* (0.478)	0.104 (0.176)	0.971** (0.412)	0.067 (0.166)	0.037 (0.172)	0.078 (0.166)	0.126 (0.200)
=1 if under 2 years old	-0.228* (0.131)	-0.204 (0.136)	-0.236* (0.132)	-0.152 (0.144)	-0.220* (0.131)	-0.246* (0.146)	-0.222* (0.131)	-0.214 (0.136)	-0.230* (0.131)	-0.212 (0.136)	-0.223* (0.132)	-0.217* (0.131)	-0.210 (0.131)	-0.271* (0.143)
Age in months	-0.015 (0.011)	-0.014 (0.011)	-0.015 (0.011)	-0.012 (0.011)	-0.015 (0.011)	-0.018 (0.012)	-0.014 (0.011)	-0.011 (0.011)	-0.015 (0.011)	-0.009 (0.012)	-0.014 (0.011)	-0.014 (0.011)	-0.014 (0.011)	-0.021* (0.013)
Age in months squared	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
=1 if child of WEAL respondent	0.049 (0.164)	0.150 (0.173)	0.056 (0.165)	0.019 (0.177)	0.062 (0.165)	0.129 (0.178)	0.049 (0.165)	0.006 (0.175)	0.054 (0.164)	0.084 (0.171)	0.043 (0.165)	0.045 (0.164)	0.044 (0.164)	0.071 (0.174)
Empowerment measures														
M-F difference in empowerment measure	0.053 (0.175)	1.012 (1.063)	-0.115 (0.076)	0.888 (0.700)	0.050 (0.043)	0.615* (0.321)	0.014 (0.022)	0.063 (0.093)	-0.001 (0.005)	0.032* (0.018)	-0.018 (0.024)	-0.037 (0.081)	-0.053*** (0.017)	0.100 (0.124)
M-F difference in age	0.011 (0.011)	0.006 (0.011)	0.011 (0.011)	0.006 (0.012)	0.010 (0.011)	0.002 (0.013)	0.011 (0.011)	0.009 (0.011)	0.011 (0.011)	0.008 (0.012)	0.011 (0.011)	0.012 (0.011)	0.012 (0.011)	0.008 (0.012)
M-F difference in education	0.012 (0.014)	0.003 (0.017)	0.014 (0.014)	0.003 (0.018)	0.012 (0.014)	-0.000 (0.017)	0.011 (0.014)	-0.003 (0.017)	0.012 (0.014)	-0.009 (0.019)	0.012 (0.014)	0.014 (0.015)	0.015 (0.014)	0.006 (0.017)
Interaction of child sex with empowerment measures														
FemaleXM-F difference in empowerment	0.002 (0.241)	-2.548* (1.504)	0.172* (0.097)	-1.326 (0.899)	0.027 (0.061)	-1.017** (0.502)	-0.025 (0.028)	-0.243* (0.142)	-0.003 (0.007)	-0.085** (0.037)	0.009 (0.034)	0.068 (0.119)	0.047** (0.024)	-0.255 (0.233)
FemaleXM-F difference in age	-0.008 (0.013)	0.000 (0.014)	-0.010 (0.013)	0.004 (0.016)	-0.008 (0.013)	-0.001 (0.015)	-0.008 (0.013)	-0.008 (0.013)	-0.008 (0.013)	-0.008 (0.014)	-0.009 (0.013)	-0.010 (0.013)	-0.009 (0.013)	-0.009 (0.014)
FemaleXM-F difference in education	-0.024 (0.017)	-0.010 (0.020)	-0.025 (0.017)	-0.015 (0.020)	-0.024 (0.017)	-0.011 (0.020)	-0.022 (0.018)	-0.011 (0.021)	-0.024 (0.017)	-0.001 (0.022)	-0.024 (0.017)	-0.028 (0.018)	-0.027 (0.017)	-0.022 (0.020)

Table 4.2 Continued

Variable	Dependent variable: weight-for-height z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<i>Household head characteristics</i>														
Age of household head	-0.003 (0.019)	0.000 (0.020)	-0.004 (0.019)	0.002 (0.021)	-0.003 (0.019)	-0.001 (0.019)	-0.003 (0.019)	0.002 (0.019)	-0.003 (0.019)	0.008 (0.021)	-0.003 (0.019)	-0.004 (0.018)	-0.003 (0.019)	-0.003 (0.020)
Age squared of household head	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Education of household head	0.005 (0.010)	0.008 (0.011)	0.006 (0.010)	0.005 (0.013)	0.005 (0.010)	0.007 (0.011)	0.006 (0.011)	0.010 (0.012)	0.006 (0.010)	0.010 (0.011)	0.006 (0.010)	0.006 (0.011)	0.006 (0.010)	0.009 (0.013)
N	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753	1,753
F	1.546	1.499	1.596	1.299	1.695	1.374	1.535	1.526	1.598	1.534	1.574	1.543	1.816	1.432
Hansen J p, Ho: instruments valid		0.150		0.147		0.255		0.148		0.389		0.059		0.178
Under ID test p, Ho: underidentified		0.000		0.007		0.039		0.000		0.001		0.000		0.361
Weak ID test stat (Kleibergen-Paap rk Wald F)		9.351		2.173		2.030		7.854		3.808		9.407		1.002
Anderson-Rubin, Ho: endogvars irrelevant														
A-R Wald test, p-value		0.043		0.043		0.043		0.043		0.043		0.043		0.043
A-R Wald Chi2 test, p-value		0.036		0.036		0.036		0.036		0.036		0.036		0.036
Endogeneity test p, Ho: exogenous		0.114		0.354		0.127		0.304		0.036		0.911		0.113

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Table 4.3 Under-five children's weight-for-age z-scores and measures of male-female difference in empowerment

Variable	Dependent variable: weight-for-age z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Child characteristics														
=1 if female	0.012 (0.164)	0.073 (0.209)	0.035 (0.162)	-0.077 (0.295)	-0.001 (0.163)	0.130 (0.189)	0.040 (0.177)	0.268 (0.421)	0.012 (0.169)	0.354 (0.339)	-0.009 (0.162)	0.011 (0.173)	-0.001 (0.160)	-0.005 (0.190)
=1 if under 2 years old	-0.175 (0.117)	-0.172 (0.118)	-0.189 (0.117)	-0.165 (0.128)	-0.178 (0.117)	-0.210* (0.124)	-0.175 (0.117)	-0.163 (0.120)	-0.185 (0.117)	-0.179 (0.119)	-0.176 (0.117)	-0.184 (0.118)	-0.166 (0.116)	-0.201 (0.123)
Age in months	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.032*** (0.010)	-0.029*** (0.010)	-0.027*** (0.010)	-0.029*** (0.010)	-0.027*** (0.010)	-0.029*** (0.010)	-0.030*** (0.010)	-0.028*** (0.010)	-0.031*** (0.011)
Age in months squared	0.000* (0.000)	0.000* (0.000)	0.000** (0.000)	0.000* (0.000)	0.000** (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000* (0.000)	0.000** (0.000)	0.000* (0.000)	0.000* (0.000)
=1 if child of WEAI respondent	-0.027 (0.156)	-0.010 (0.163)	-0.028 (0.157)	-0.041 (0.159)	-0.030 (0.156)	-0.042 (0.160)	-0.038 (0.156)	-0.044 (0.158)	-0.034 (0.156)	-0.024 (0.154)	-0.048 (0.157)	-0.033 (0.156)	-0.042 (0.156)	-0.026 (0.161)
Empowerment measures														
M-F difference in empowerment measure	0.026 (0.162)	0.267 (0.952)	-0.136** (0.064)	0.152 (0.602)	0.043 (0.042)	0.073 (0.279)	0.009 (0.019)	0.049 (0.084)	-0.003 (0.004)	0.011 (0.016)	-0.017 (0.020)	0.024 (0.078)	-0.040** (0.016)	0.057 (0.110)
M-F difference in age	-0.006 (0.013)	-0.007 (0.013)	-0.005 (0.013)	-0.006 (0.014)	-0.006 (0.013)	-0.006 (0.014)	-0.005 (0.013)	-0.005 (0.013)	-0.006 (0.013)	-0.006 (0.014)	-0.005 (0.013)	-0.006 (0.013)	-0.005 (0.013)	-0.007 (0.014)
M-F difference in education	0.004 (0.014)	0.002 (0.015)	0.005 (0.014)	0.002 (0.015)	0.003 (0.014)	0.001 (0.015)	0.003 (0.014)	-0.002 (0.017)	0.005 (0.014)	-0.004 (0.017)	0.004 (0.014)	0.003 (0.014)	0.006 (0.014)	0.001 (0.014)
Interaction of child sex with empowerment measures														
FemaleXM-F difference in empowerment	-0.188 (0.216)	-0.699 (1.271)	0.169** (0.083)	-0.233 (0.761)	-0.048 (0.056)	-0.501 (0.416)	-0.016 (0.024)	-0.088 (0.123)	-0.002 (0.005)	-0.035 (0.031)	-0.003 (0.028)	-0.044 (0.109)	0.025 (0.021)	-0.086 (0.215)
FemaleXM-F difference in age	-0.005 (0.015)	-0.004 (0.015)	-0.007 (0.015)	-0.004 (0.018)	-0.006 (0.015)	-0.003 (0.016)	-0.006 (0.015)	-0.006 (0.015)	-0.006 (0.015)	-0.005 (0.015)	-0.006 (0.015)	-0.005 (0.014)	-0.007 (0.015)	-0.005 (0.016)
FemaleXM-F difference in education	-0.020 (0.017)	-0.017 (0.018)	-0.023 (0.016)	-0.020 (0.017)	-0.021 (0.016)	-0.015 (0.018)	-0.020 (0.017)	-0.014 (0.020)	-0.022 (0.017)	-0.012 (0.019)	-0.021 (0.016)	-0.019 (0.018)	-0.023 (0.016)	-0.019 (0.018)

Table 4.3 Continued

Variable	Dependent variable: weight-for-age z-scores													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<i>Household head characteristics</i>														
Age of household head	0.008 (0.018)	0.009 (0.019)	0.007 (0.018)	0.009 (0.020)	0.008 (0.018)	0.008 (0.019)	0.009 (0.018)	0.010 (0.019)	0.008 (0.019)	0.012 (0.020)	0.008 (0.018)	0.009 (0.018)	0.008 (0.018)	0.008 (0.019)
Age squared of household head	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Education of household head	0.031*** (0.009)	0.031*** (0.009)	0.031*** (0.009)	0.031*** (0.011)	0.030*** (0.009)	0.033*** (0.009)	0.031*** (0.009)	0.031*** (0.010)	0.031*** (0.009)	0.032*** (0.009)	0.031*** (0.009)	0.030*** (0.009)	0.031*** (0.009)	0.031*** (0.011)
N	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774	1,774
F	4.611	4.694	4.900	4.517	4.620	4.410	4.581	4.518	4.732	4.552	4.662	4.595	4.784	4.599
Hansen J p, Ho: instruments valid		0.604		0.603		0.758		0.652		0.687		0.634		0.652
Under ID test p, Ho: underidentified		0.000		0.005		0.038		0.000		0.003		0.000		0.427
Weak ID test stat (Kleibergen-Paap rk Wald F)		9.631		2.267		2.104		4.972		2.689		7.290		0.911
Anderson-Rubin, Ho: endogvars irrelevant														
A-R Wald test, p-value		0.709		0.709		0.709		0.709		0.709		0.709		0.709
A-R Wald Chi2 test, p-value		0.691		0.691		0.691		0.691		0.691		0.691		0.691
Endogeneity test p, Ho: exogenous		0.938		0.956		0.690		0.772		0.604		0.781		0.615

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Children's Education

For younger children aged 6–10 years old (Table 4.4), the most notable results are in the asset ownership (IV model 4) and asset decisions (OLS model 5) specifications. We find that an increase in men's asset ownership (a higher gender gap) is correlated with more education for both boys and girls, whereas an increase in women's asset decisionmaking (smaller gender gap) is weakly correlated with an increase in education favoring boys. Relative bargaining power measured as male-female gaps in age and education are insignificant for boys' education. However, across all the specifications, we find a highly significant and positive effect of women's education and education among young girls.

For older children aged 11–17 years old (Table 4.5), we find that women's overall empowerment score and participation in groups (smaller gender gaps) are more likely to increase education for both boys and girls. Across all specifications, we also find that households where the primary female is more educated are also more likely to have more educated boys and girls, with much larger magnitudes for older children compared with younger children. This might suggest that, controlling for household wealth and husband characteristics, more educated women are able to negotiate in favor of keeping children in school until they are older.

For both children's age groups, the education of the household head is highly significant in predicting children's education outcomes, although the magnitudes are much higher for older children. Consistent with our findings on nutritional status, this could be reflecting a "wealth" effect, where households with better-educated heads can afford to invest in children's nutritional status and education.

Table 4.4 Education, deviation from cohort means, co-resident children aged 6–10 years

Variable	Dependent variable: education, deviation from cohort means, co-resident children 6–10 years													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Child characteristics														
=1 if female	0.097 (0.092)	0.065 (0.142)	0.107 (0.090)	0.285 (0.195)	0.102 (0.090)	0.118 (0.112)	0.055 (0.103)	-0.107 (0.271)	0.022 (0.098)	-0.058 (0.199)	0.099 (0.090)	0.081 (0.097)	0.101 (0.090)	0.210 (0.168)
Age in years	-0.095 (0.153)	-0.085 (0.155)	-0.087 (0.153)	-0.047 (0.169)	-0.091 (0.153)	-0.098 (0.170)	-0.087 (0.153)	-0.039 (0.167)	-0.085 (0.153)	-0.074 (0.155)	-0.091 (0.154)	-0.088 (0.156)	-0.091 (0.153)	-0.069 (0.258)
Age in years squared	0.006 (0.010)	0.005 (0.010)	0.006 (0.010)	0.003 (0.011)	0.006 (0.010)	0.006 (0.011)	0.005 (0.010)	0.002 (0.011)	0.005 (0.010)	0.004 (0.010)	0.006 (0.010)	0.005 (0.010)	0.006 (0.010)	0.004 (0.016)
=1 if child of WEAI respondent	0.181** (0.085)	0.191** (0.086)	0.185** (0.085)	0.214** (0.096)	0.181** (0.085)	0.213** (0.090)	0.185** (0.085)	0.206** (0.090)	0.183** (0.084)	0.180** (0.084)	0.184** (0.085)	0.179** (0.086)	0.185** (0.085)	0.023 (0.153)
Empowerment measures														
M-F difference in empowerment measure	0.038 (0.102)	-0.272 (0.509)	0.050 (0.043)	0.084 (0.338)	0.005 (0.028)	-0.066 (0.265)	0.001 (0.011)	0.107** (0.052)	-0.004* (0.003)	0.002 (0.010)	-0.008 (0.015)	-0.034 (0.071)	-0.008 (0.010)	0.317 (0.199)
M-F difference in age	-0.004 (0.007)	-0.003 (0.007)	-0.004 (0.007)	-0.002 (0.007)	-0.004 (0.007)	-0.004 (0.007)	-0.004 (0.007)	-0.001 (0.007)	-0.004 (0.007)	-0.003 (0.007)	-0.004 (0.007)	-0.003 (0.007)	-0.004 (0.007)	0.004 (0.010)
M-F difference in education	-0.002 (0.008)	-0.002 (0.008)	-0.001 (0.008)	0.005 (0.010)	-0.002 (0.008)	0.000 (0.010)	-0.001 (0.008)	0.002 (0.009)	-0.001 (0.008)	-0.002 (0.008)	-0.001 (0.008)	0.000 (0.009)	-0.001 (0.008)	-0.022 (0.021)
Interaction of child sex with empowerment measures														
FemaleXM-F difference in empowerment	0.079 (0.141)	0.280 (0.869)	0.014 (0.061)	0.773 (0.706)	0.019 (0.036)	-0.116 (0.347)	0.015 (0.014)	0.070 (0.076)	0.008** (0.003)	0.016 (0.017)	0.019 (0.019)	0.069 (0.082)	0.008 (0.014)	0.131 (0.299)
FemaleXM-F difference in age	-0.002 (0.008)	-0.003 (0.009)	-0.002 (0.008)	-0.010 (0.011)	-0.002 (0.008)	0.000 (0.009)	-0.002 (0.008)	-0.003 (0.008)	-0.002 (0.008)	-0.003 (0.008)	-0.002 (0.008)	-0.004 (0.008)	-0.002 (0.008)	-0.013 (0.013)
FemaleXM-F difference in education	-0.023** (0.011)	-0.024** (0.011)	-0.024** (0.011)	-0.034** (0.014)	-0.023** (0.011)	-0.020 (0.013)	-0.024** (0.011)	-0.028** (0.012)	-0.025** (0.011)	-0.026** (0.011)	-0.024** (0.011)	-0.027** (0.012)	-0.024** (0.011)	-0.007 (0.023)

Table 4.4 Continued

Variable	Dependent variable: education, deviation from cohort means, co-resident children 6–10 years													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<i>Household head characteristics</i>														
Age of household head	-0.001 (0.012)	-0.002 (0.013)	-0.001 (0.012)	-0.002 (0.013)	-0.001 (0.012)	-0.004 (0.013)	-0.002 (0.013)	-0.012 (0.014)	-0.002 (0.012)	-0.002 (0.013)	-0.001 (0.013)	-0.002 (0.013)	-0.001 (0.012)	0.002 (0.019)
Age squared of household head	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Education of household head	0.029*** (0.006)	0.029*** (0.006)	0.027*** (0.006)	0.019* (0.010)	0.029*** (0.006)	0.028*** (0.006)	0.029*** (0.006)	0.027*** (0.007)	0.029*** (0.006)	0.029*** (0.006)	0.029*** (0.006)	0.028*** (0.006)	0.029*** (0.006)	0.023** (0.011)
N	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308	2,308
F	4.634	4.614	4.650	3.982	4.608	4.523	4.650	4.129	4.719	4.493	4.635	4.607	4.638	1.854
Hansen J p, Ho: instruments valid		0.014		0.087		0.021		0.236		0.029		0.015		0.968
Under ID test p, Ho: underidentified		0.000		0.478		0.182		0.001		0.000		0.000		0.153
Weak ID test stat (Kleibergen-Paap Wald F)		6.253		1.032		1.253		9.893		5.498		16.085		1.791
Anderson-Rubin, Ho: endogvars irrelevant														
A-R Wald test, p-value		0.010		0.010		0.010		0.010		0.010		0.010		0.010
A-R Wald Chi2 test, p-value		0.008		0.008		0.008		0.008		0.008		0.008		0.008
Endogeneity test p, Ho: exogenous		0.932		0.194		0.887		0.061		0.216		0.972		0.001

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Table 4.5 Education, deviation from cohort means, co-resident children aged 11–17 years

Variable	Dependent variable: education, deviation from cohort means, co-resident children 11–17 years													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Child characteristics														
=1 if female	0.582*** (0.202)	0.752** (0.301)	0.576*** (0.204)	0.885** (0.360)	0.567*** (0.203)	0.575** (0.288)	0.428* (0.229)	1.488 (1.084)	0.405* (0.214)	0.333 (0.739)	0.569*** (0.203)	0.747*** (0.270)	0.567*** (0.203)	0.603* (0.334)
Age in years	-0.040 (0.690)	0.081 (0.701)	-0.037 (0.690)	0.286 (0.759)	-0.094 (0.690)	-0.093 (0.697)	-0.108 (0.691)	-0.093 (0.741)	-0.087 (0.691)	-0.075 (0.690)	-0.113 (0.691)	-0.013 (0.734)	-0.034 (0.694)	0.642 (1.396)
Age in years squared	0.002 (0.027)	-0.003 (0.027)	0.002 (0.027)	-0.010 (0.029)	0.005 (0.027)	0.005 (0.027)	0.005 (0.027)	0.004 (0.029)	0.004 (0.027)	0.004 (0.027)	0.005 (0.027)	0.001 (0.028)	0.002 (0.027)	-0.024 (0.054)
=1 if child of WEAL respondent	0.728*** (0.228)	0.673*** (0.233)	0.745*** (0.229)	0.753*** (0.230)	0.748*** (0.230)	0.746*** (0.232)	0.759*** (0.231)	0.743*** (0.281)	0.764*** (0.230)	0.769*** (0.243)	0.739*** (0.229)	0.744*** (0.243)	0.742*** (0.231)	0.729*** (0.249)
Empowerment measures														
M-F difference in empowerment measure	-0.443* (0.251)	-0.530 (1.554)	-0.154 (0.105)	-1.723** (0.683)	-0.037 (0.069)	-0.004 (0.457)	0.005 (0.026)	0.384* (0.201)	-0.006 (0.006)	-0.027 (0.045)	-0.055 (0.035)	0.361 (0.290)	0.019 (0.025)	0.302 (0.400)
M-F difference in age	0.001 (0.015)	-0.001 (0.015)	0.001 (0.015)	0.007 (0.016)	0.001 (0.015)	0.001 (0.015)	0.001 (0.015)	0.021 (0.021)	-0.000 (0.015)	-0.004 (0.017)	0.002 (0.015)	-0.007 (0.017)	0.001 (0.015)	-0.004 (0.018)
M-F difference in education	0.098*** (0.024)	0.102*** (0.026)	0.102*** (0.024)	0.123*** (0.028)	0.098*** (0.024)	0.099*** (0.027)	0.097*** (0.024)	0.092*** (0.029)	0.098*** (0.023)	0.096*** (0.024)	0.096*** (0.024)	0.125*** (0.033)	0.101*** (0.024)	0.132*** (0.049)
Interaction of child sex with empowerment measures														
FemaleXM-F difference in empowerment	-0.165 (0.338)	-1.880 (2.404)	0.024 (0.132)	0.943 (0.953)	-0.011 (0.086)	-0.036 (0.772)	0.037 (0.033)	-0.239 (0.284)	0.014 (0.008)	0.020 (0.061)	0.019 (0.045)	-0.456 (0.374)	-0.017 (0.031)	-0.284 (0.460)
FemaleXM-F difference in age	-0.000 (0.017)	0.008 (0.020)	-0.002 (0.017)	-0.004 (0.020)	-0.002 (0.017)	-0.002 (0.017)	-0.001 (0.017)	-0.014 (0.023)	-0.000 (0.017)	0.002 (0.020)	-0.003 (0.017)	0.006 (0.019)	-0.002 (0.017)	0.003 (0.021)
FemaleXM-F difference in education	0.013 (0.026)	0.023 (0.031)	0.013 (0.026)	0.016 (0.029)	0.012 (0.026)	0.013 (0.031)	0.011 (0.026)	0.018 (0.030)	0.010 (0.026)	0.010 (0.028)	0.010 (0.026)	0.047 (0.040)	0.014 (0.026)	0.040 (0.045)

Table 4.5 Continued

Variable	Dependent variable: education, deviation from cohort means, co-resident children 11–17 years													
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	Empowerment score		Group membership		Credit decisions		Asset ownership		Asset decisions		Ladder score		Satisfaction score	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
<i>Household head characteristics</i>														
Age of household head	0.087** (0.043)	0.089** (0.043)	0.087** (0.043)	0.075* (0.043)	0.086* (0.044)	0.087* (0.048)	0.086* (0.044)	0.087* (0.053)	0.086** (0.043)	0.080* (0.045)	0.090** (0.043)	0.088* (0.046)	0.088** (0.044)	0.092** (0.045)
Age squared of household head	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.001)	-0.001* (0.000)	-0.001 (0.001)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001* (0.000)
Education of household head	0.146*** (0.014)	0.152*** (0.016)	0.149*** (0.014)	0.181*** (0.023)	0.145*** (0.014)	0.145*** (0.015)	0.143*** (0.014)	0.135*** (0.018)	0.144*** (0.014)	0.144*** (0.014)	0.146*** (0.014)	0.142*** (0.015)	0.145*** (0.014)	0.148*** (0.015)
N	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911	1,911
F	14.153	13.284	14.100	12.426	14.071	13.974	14.233	13.343	14.229	13.671	14.255	12.970	14.015	13.010
Hansen J p, Ho: instruments valid		0.001		0.006		0.000		0.007		0.000		0.001		0.001
Under ID test p, Ho: underidentified		0.000		0.013		0.017		0.224		0.010		0.004		0.828
Weak ID test stat (Kleibergen-Paap Wald F)		5.479		2.265		2.140		1.906		2.742		2.394		0.512
Anderson-Rubin, Ho: endogvars irrelevant														
A-R Wald test, p-value		0.000		0.000		0.000		0.000		0.000		0.000		0.000
A-R Wald Chi2 test, p-value		0.000		0.000		0.000		0.000		0.000		0.000		0.000
Endogeneity test p, Ho: exogenous		0.423		0.050		0.956		0.105		0.683		0.370		0.821

Source: Bangladesh Integrated Household Survey, 2011–2012 (A. Ahmed 2013).

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Table 4.6 Summary of regression results

Variable	Regression Results
Nutrition	
Height-for-age (Table 4.1)	When the gender gap in credit decisionmaking is smaller, girls are more likely to be taller than their reference age group. We also find that households led by a well-educated male household head are more likely to have taller children.
Weight-for-height (Table 4.2)	An increase in women's life satisfaction increases boys' weight-for-height, but less so for girls. A narrower male-female gap in asset decisionmaking is associated with better nutritional status for girls in the short run. It appears that higher involvement in groups by women relative to men may end up reducing girls' weight-for-height; this could point to excessive demands on women's time owing to participation in group activities, or possible backlash from men within the household.
Weight-for-age (Table 4.3)	An increase in women's participation in groups and life satisfaction relative to their husbands is likely to improve children's weight-for-age, although the results for group membership suggest that the effect is likely to favor boys rather than girls. Households led by a well-educated male household head are more likely to have children with higher weight-for-age than their reference age group.
Education	
Education of children aged 6-10 years (Table 4.4)	A higher gender gap in asset ownership is associated with more education for both boys and girls, whereas a smaller gender gap in asset decisionmaking is weakly correlated with an increase in education favoring boys. Women's education is seen to have a strongly positive association with the education of young girls. Households where the head is more educated are likely to invest more in child education.
Education of children aged 11-17 years (Table 4.5)	Smaller gender gaps in overall empowerment and participation in groups are more likely to increase education for both boys and girls. Households where the primary female and household head are more educated are also more likely to have more educated boys and girls.

Source: Authors.

5. CONCLUSION

Using a household bargaining framework, our analysis provides empirical evidence on the relationship between relative empowerment between men and women in the same household and children's nutrition and education outcomes in rural Bangladesh. Our primary goal is to understand whether and to what extent empowerment gaps between men and women within the household are associated with children's well-being, and whether these gender inequalities have differential effects on boys and girls. In addition to human resources brought to marriage as proxy measures of relative bargaining power, we use a new direct, survey-based index called the Women's Empowerment in Agriculture Index (WEAI), which assesses women's empowerment in five domains in agriculture. These domains include decisionmaking over production, ownership and decisions over resources, control over use of income, leadership in the community, and time use. Because the WEAI requires the same information for both the primary male and the primary female decisionmakers in the household, we are able to construct measures of intrahousehold disparities.

Our findings suggest that empowerment gaps are only weakly linked to children's nutrition, although significant differences exist between boys and girls depending on the empowerment measures used. Increasing women's decisionmaking over credit and assets is associated with improvements in girls' nutritional status (HAZ, WHZ), while increasing women's life satisfaction and participation in groups are associated with improvements in boys' nutritional status (WHZ, WAZ). Increasing men's asset ownership, women's participation in groups, and women's overall empowerment appear to increase schooling for primary school-aged boys and girls, although increasing women's asset decisions appears to favor boys. Younger girls aged 6–10 and older boys and girls aged 11–17 are also more likely to receive more education when women are more educated. Overall, the (male) household head's education is significantly associated with better nutrition and education outcomes for children. As our results on parental education suggest, men's empowerment may be reflecting a “wealth” effect that is invested in children's nutrition and education when they are young, while mothers' empowerment becomes more important in keeping children in school.

If households in rural Bangladesh act as one, following the unitary model, then all the measures of relative bargaining power should be insignificant. In general, our findings are mixed. Our results do suggest, however, that there is more consensus over investments in children's nutrition, especially for boys, perhaps reflecting common preferences between husband and wife on how sons should be raised, and the dependence of women on adult sons in their old age. There appears to be less consensus over investments in girls' schooling, where women's own education exerts a significant influence. Women's overall empowerment, group membership, and own education are especially significant in increasing schooling for secondary school-aged children, which suggests that both girls and boys are kept in school, and out of the labor force or marriage market, for longer. This is consistent with the literature documenting a strong positive association between women's status improvements in children's well-being (Quisumbing and Maluccio 2003; Bhagowalia et al. 2012; Allendorf 2007; Skoufias 2005; Ackerson and Subramanian 2008; Smith et al. 2003; Shroff et al. 2011; Quisumbing and Hallman 2003; van den Bold, Quisumbing, and Gillespie 2013; Cunningham et al. 2015), and justifies targeting programs toward improving women's bargaining position in the household.

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Fax: +1-202-467-4439
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IFPRI DHAKA OFFICE

House 10A, Road 35, Gulshan 2
Dhaka, 1212
Bangladesh
+88.02.989.8686
Fax: +88.02.989.6760