

ARTICLE

Intrahousehold empowerment gaps in agriculture and children's well-being in Bangladesh

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Abstract

This article examines the relationship between empowerment gaps between spouses and children's nutritional status and education using nationally representative data from the 2012 Bangladesh Integrated Household Survey. We measure relative empowerment of spouses using the recently developed Women's Empowerment in Agriculture Index. We find that while gender gaps in empowerment are only linked weakly to children's nutritional status, fathers' and mothers' empowerment have different effects on investment in children. Fathers' empowerment is positively associated with younger children's nutrition and schooling, while mothers' empowerment is more important for girls' education in general and in keeping older boys and girls in school.

KEYWORDS

Bangladesh, education, gender, nutrition, women's empowerment

1 | INTRODUCTION

A large body of literature documents a strong positive association between women's status and their control over resources and investments in children's human capital, particularly nutrition and education (Ackerson & Subramanian, 2008; Allendorf, 2007; Bhagowalia, Menon, Quisumbing, & Soundararajan, 2012; Cunningham, Ruel, Ferguson, & Uauy, 2015; Quisumbing & Maluccio, 2003;

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Shroff et al., 2011; Skoufias, 2005). Although much of the existing evidence is associational, arising partly from assortative mating and unobservable factors (Duflo, 2012), a systematic review based on rigorous impact evaluations (albeit without the counterfactual of targeting transfers to men) found that targeting cash transfers towards women appears to improve child nutrition and health (Yoong, Rabinovich, & Diepeveen, 2012). However, few studies examine a range of outcomes that capture the time-bound nature of human capital investments, with investments in nutritional status being important while the child is younger (the “1,000 days” from conception to two years of age) (Black et al., 2008) and investments in schooling being critical once the child reaches school age. Keeping children in school also becomes more relevant for older children, once the opportunity cost of keeping children in school increases. This could result from the need for child labour on the farm, particularly for poorer households, or a desire to pull girls out of school in societies where early marriage is the norm.

Another strand of the literature considers a broader 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 analyse more direct measures of empowerment, such as indicators related to decision-making power (Allendorf, 2007; Bhagowalia et al., 2012; Shroff et al., 2011) and domestic violence (Ackerson & Subramanian, 2008; Asling-Monemi, Peña, Ellsberg, & Persson, 2003; Asling-Monemi, Tabassum Naved, & Persson, 2008; Bhagowalia et al., 2012). However, these studies typically focus on women’s empowerment in the domestic sphere. Relatively few studies attempt to measure empowerment in the productive sphere, particularly in the agricultural sector (Malapit, Kadiyala, Quisumbing, Cunningham, & Tyagi, 2015; Malapit & Quisumbing, 2015). Most studies, while recognizing that empowerment is multi-dimensional, do not compare empowerment measures across a range of domains within and beyond agriculture.

Lastly, many of these studies collect information from women only and cannot be used to measure gaps between men and women’s empowerment within the household (henceforth intrahousehold empowerment gaps). Considerable empirical evidence supports the collective model of the household, in which individuals do not necessarily pool resources nor share the same preferences (Behrman, 1997; Haddad, Hoddinott, & Alderman (Eds.), 1997). Having similar—if not identical—information on male and female decision-makers within the same household is important to understand how intrahousehold empowerment gaps affect household decisions. Where both men and women may have preferences regarding investments in children’s human capital, particularly whether to invest more in sons or daughters, both men’s and women’s empowerment may be important determinants of child well-being.

In this article, we use nationally-representative data from rural Bangladesh to 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. Our primary goal is to understand whether intrahousehold empowerment gaps are associated with investments in children’s human capital, and whether these affect boys and girls differentially. We measure empowerment in agriculture using the Women’s Empowerment in Agriculture Index (WEAI), a survey-based index which assesses empowerment in five domains in agriculture: decision-making over production, ownership and decisions 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 female decision-makers in the household, which is then used to construct measures of intrahousehold disparities.

Our findings suggest that intrahousehold empowerment gaps are only weakly linked to children's nutrition, although different measures of empowerment reveal significant differences between boys' and girls' outcomes. Overall, the father's (household head's) education is significantly associated with better nutrition and education outcomes for children, but younger girls aged six to 10 years old and older boys and girls aged 11–17 years old are more likely to receive more education when mothers are more educated. Our results suggest that fathers' schooling may be reflecting a “wealth” effect that is invested in children's nutrition and education when they are young, while mothers' schooling, which reflects their overall empowerment beyond the productive sphere, becomes more important in girls' education in general and keeping older children, regardless of sex, in school.

2 | CONCEPTUAL FRAMEWORK

In line with the extensive empirical evidence rejecting the unitary model of the household that assumes all household members have the same preferences and all household resources are pooled (Alderman, Chiappori, Haddad, Hoddinott, & Kanbur, 1995; Behrman, 1997; Haddad et al., 1997; Strauss, Mwapu, & Beegle, 2000; Quisumbing (Ed.), 2003), we assume a collective agricultural household composed of a principal male and female decision-maker who may have different endowments, constraints and preferences. Men and women may have access to different productive resources, technologies or skills. They may be bound by gender-based constraints that define the extent of their participation in agriculture and other livelihoods, resulting in differences in the types of investments that men and women can make towards children's human capital. Gender norms may also result in different preferences between men and women on what types of food to consume and how to distribute food among household members, when and how to seek healthcare, and whether and for how long to send children to school.¹ Therefore, decisions on what and how to produce, and the intra-household 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 investment in children's human capital can be derived from a collective agricultural household that includes a production function for children's human capital and children's human capital in the utility function (Quisumbing & Maluccio, 2003). The reduced form of the demand for children's human capital can be expressed as some function of relative bargaining power as follows:

$$\mathbf{c}_i = f_1(\mu(a_m, a_f), \mathbf{I}, \mathbf{H}) \quad (1)$$

where \mathbf{c}_i is a vector of children's human capital 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 & Maluccio, 2003).

A variety of proxies for bargaining power have been used in the literature, including: (1) shares of income earned by women (Hoddinott & Haddad, 1995), (2) unearned income (Schultz, 1990; Thomas,

¹Gender norms may not only influence bargaining power, they can also be the subject of bargaining (Agarwal, 1997). While we acknowledge that gender norms are an important constituent of bargaining power, measuring this aspect is beyond the scope of this study.

TABLE 1 The Five Domains of Empowerment in the WEAI

Domain	Indicator	Definition of indicator	Weight
Production	Input in productive decisions	Sole or joint decision-making over food and cash-crop farming, livestock, and fisheries	1/10
	Autonomy in production	Autonomy in agricultural production (what inputs to buy, what livestock to raise, etc.).	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 own assets	1/15
	Access to and decisions on credit	Access to and participation in decision-making 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 (e.g., agricultural marketing, credit, water users' groups)	1/10
	Speaking in public	Whether the respondent is comfortable speaking in public about various issues such as intervening in family disputes, ensuring proper payment of wages for public work programmes, etc.	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).

1990), (3) current assets (Doss, 1996), (4) inherited assets (Quisumbing, 1994), (5) assets at marriage (Thomas, Contreras, & Frankenberg, 2002), (6) the public provision of resources to specific household members (Lunderg, Pollak, & Wales, 1997; Rubalcava & Thomas, 2000), and more recently, interventions that provide transfers or increase resources to women (see the extensive review in Yoong et al. (2012)). Although the concept of empowerment is much broader than bargaining power, emphasizing the process of expanding agency and spanning multiple dimensions (Alkire et al., 2013; Ibrahim & Alkire, 2007; Kabeer, 1999b; Malhotra & Schuler, 2005), many of the same indicators used to measure bargaining power, such as control over resources and having a say in household decisions, are also used to measure empowerment. In this article, which empirically investigates household investments on children, greater empowerment implies greater bargaining power, and vice versa.

We use several measures of bargaining power. 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 capital² is a useful indicator of bargaining power because it reflects the

²Although human capital may be endogenous to marriage market selection or other unobservable characteristics, schooling is usually completed before marriage and can be taken as exogenous to decisions undertaken *within* the marriage (Quisumbing & Maluccio, 2003).

empowerment of individuals more broadly, extending beyond the productive sphere. Second, we use the WEAI to measure empowerment in the productive sphere. The WEAI is an aggregate index based on the Alkire-Foster methodology for multidimensional indices (Alkire & Foster, 2011a, 2011b). The WEAI survey instrument collects individual-level data from primary male and primary female decision-makers 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 decision-making 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 10 binary indicators, which are weighted equally within each domain (Table 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 10 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 article, we use the individual-level empowerment scores and component indicators of primary male and female respondents to investigate the relationship between relative empowerment in agriculture and investment in children. This enables us to assess whether intrahousehold empowerment gaps in agriculture exert any additional influence on children's human capital outcomes after controlling for relative bargaining power as proxied by human resources brought to the marriage. Finally, we examine other possible empowerment proxies that cover domains beyond agriculture such as respondents' self-assessments as to their degree of influence in the community (nine-point scale) and their satisfaction with the power to make important life-changing decisions (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.³

Several concerns can be raised regarding the measurement of empowerment differences using responses from spouses to the same question. Men and women may simply respond to questions differently. For example, men may be less inclined to report their spouses' role in decision-making. Ambler, Doss, Kieran, and Passarelli (2017) compare differences in spouses' answers to questions regarding household decision-making using the same dataset that we use in this article, and find that there is indeed substantial and systematic disagreement, with women more likely to report joint decision-making, and men more likely to report sole male decision-making. However, they find that women who report that they are involved in decision-making, even if their spouses do not agree, have better outcomes.⁴ This leads them to conclude that women's own perception of their roles is an important component of their bargaining power. Disagreements between spouses may also be caused by systematic differences in how they interpret the questions, which is a topic for further theoretical and empirical research.

A related point has to do with the concept of empowerment as agency and the ability to make strategic life choices where this option did not exist (Kabeer, 1999a). In Bangladesh, men have traditionally held power, although some men's ability to make strategic life choices may have been constrained more by poverty or by social exclusion (for some categories such as ethnic and religious minorities), than by traditional gender norms. We argue that our measure of empowerment across the five domains is still relevant for men, even if the constraints are not necessarily rooted in gender inequality—indeed, in our sample 56% of men are disempowered (Table 2). The gap between men's and women's empowerment scores captures differences in empowerment owing to gender inequality,

³These variables are similar to those included in surveys like the Gallup World Poll (www.gallupworldpoll.com) and the World Values Survey (www.worldvaluessurvey.org).

⁴It should be noted that the positive correlation is stronger when both spouses acknowledge the wife's role in decision-making.

TABLE 2 Summary Statistics

Variable	Obs	Mean	Std. Dev.
<i>Nutrition outcomes, children under 5 years</i>			
Height-for-age z-scores (HAZ)	1756	−1.84	1.45
Boys	863	−1.87	1.51
Girls	893	−1.81	1.40
Weight-for-height z-scores (WHZ)	1753	−0.77	1.19
Boys	861	−0.73	1.20
Girls	892	−0.81	1.17
Weight-for-age z-scores (WAZ)	1774	−1.60	1.08
Boys	873	−1.57	1.10
Girls	901	−1.62	1.07
Stunted	1756	0.47	0.50
Boys	863	0.48	0.50
Girls	893	0.46	0.50
Wasted	1753	0.13	0.33
Boys	861	0.12	0.33
Girls	892	0.13	0.34
Underweight	1774	0.34	0.47
Boys	873	0.32	0.47
Girls	901	0.36	0.48
<i>Education outcomes, children 6–10 years</i>			
Education, deviation from cohort means***	2308	0.00	0.81
Boys	1165	−0.05	0.82
Girls	1143	0.04	0.79
Years of education**	2308	0.92	1.13
Boys	1165	0.86	1.12
Girls	1143	0.98	1.14
<i>Education outcomes, children 11–17 years</i>			
Education, deviation from cohort means***	1911	0.05	1.91
Boys	957	−0.30	2.01
Girls	954	0.38	1.75
Years of education***	1911	4.52	2.26
Boys	957	4.16	2.29
Girls	954	4.86	2.18
<i>Individual characteristics</i>			
<i>Children under 5</i>			
Age under 2 (=1, 0 otherwise)	1774	0.42	0.49
Age (months)	1774	28.83	17.04
Female (=1, 0 otherwise)	1774	0.52	0.50
Child of WEAI respondent (=1, 0 otherwise)	1774	0.82	0.39

(Continues)

TABLE 2 (Continued)

Variable	Obs	Mean	Std. Dev.
<i>Children aged 6–10</i>			
Age (years)	2,308	8.11	1.45
Female (=1, 0 otherwise)	2,308	0.50	0.50
Child of WEAI respondent (=1, 0 otherwise)	2,308	0.89	0.31
<i>Children aged 11–17</i>			
Age (years)	1,911	12.95	1.37
Female (=1, 0 otherwise)	1,911	0.51	0.50
Child of WEAI respondent (=1, 0 otherwise)	1,911	0.92	0.26
<i>Human resources brought to marriage</i>			
Age of woman	3156	35.51	10.35
Age of man (household head)	3156	43.60	11.99
Difference in age (man/woman)	3156	8.08	4.52
Years of education of woman	3156	3.07	3.46
Years of education of man (household head)	3156	3.06	3.88
Difference in years of education (man/woman)	3156	−0.01	3.27
<i>Empowerment variables</i>			
Man is disempowered (=1, 0 otherwise)	3156	0.56	0.49
Woman is disempowered (=1, 0 otherwise)	3156	0.76	0.42
Empowerment score of man	3156	0.80	0.19
Empowerment score of woman	3156	0.65	0.24
Difference in empowerment score (man/woman)	3156	0.15	0.26
Number of groups man is an active member of	3156	0.16	0.43
Number of groups woman is an active member of	3156	0.34	0.50
Difference in number of groups (man/woman)	3156	−0.18	0.63
Average number of decisions over credit, made by man	3156	1.28	0.95
Average number of decisions over credit, made by woman	3156	0.99	0.98
Difference in average numbers of decisions over credit (man/woman)	3156	0.29	0.97
Number of assets man has self/joint ownership of	3156	21.71	9.51
Number of assets woman has self/joint ownership of	3156	11.12	9.46
Difference in number of assets owned (man/woman)	3156	10.59	10.40
Number of self/joint decisions over purchase, sale or transfer of assets made by man	3156	5.20	2.38
Number of self/joint decisions over purchase, sale or transfer of assets made by woman	3156	1.86	1.44
Difference in number of decisions over purchase (man/woman)	3156	3.34	2.47
Ladder score of man	3156	3.28	1.67
Ladder score of woman	3156	2.66	1.35

(Continues)

TABLE 2 (Continued)

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

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

even if poverty or social exclusion may be experienced differently by household members according to their gender and age.

Finally, we acknowledge the possibility that men, who have more agency than women in rural Bangladesh, may be overstating their own roles in decision-making and degree of influence in the community. This would create an upward bias in the measurement of the empowerment gap.

3 | EMPIRICAL SPECIFICATION

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

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

where C_{ij} is a vector of human capital 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 reflects the relationship between the outcome variable and relative empowerment, controlling for other relevant 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 earlier work using the Bangladesh Integrated Household Survey (BIHS) (Sraboni, Malapit, Quisumbing, & Ahmed, 2013), we estimated equation (2) using ordinary least squares (OLS) as well as standard instrumental variables (IV) techniques to correct for potential endogeneity bias. However, the IV diagnostics using child outcomes show evidence of weak instruments.⁵ In this article, we report only the OLS results, and thus interpret our findings as associative rather than causal.

4 | CONTEXT AND DATA

4.1 | Context

Malnutrition among women and children is a pressing problem in Bangladesh, which is not on track for meeting any of the World Health Assembly targets related to stunting, overweight and wasting (Development Initiatives, 2018). Like previous studies (National Institute of Population Research and Training (NIPORT), Mitra and Associates, & MEASURE DHS ICF International Inc., 2013; Ahmed et al., 2012), child anthropometric indicators from the 2012 BIHS show high rates of malnutrition

⁵Following Sraboni et al. (2014), we used instruments that 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. 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 co-resident in the household, and (5) whether the homestead land has been inherited by the woman. The IV results are available upon request.

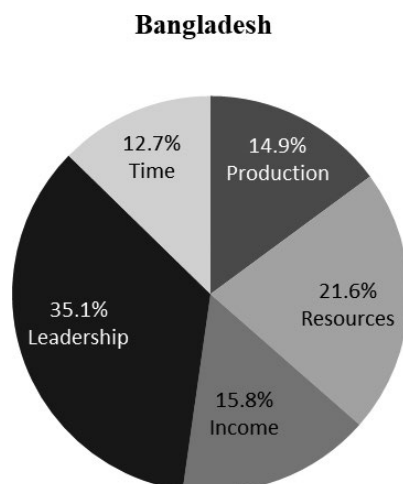


FIGURE 1 Contribution of Each of the Five Domains to the Disempowerment of Women
Source: Sraboni, Quisumbing, and Ahmed (2013).

in rural Bangladesh. Close to half of under-five children are stunted (47%), and over a third are underweight (34%) (Table 2). As in other countries in South Asia, the low status of women and gender gaps in health and education contribute to chronic child malnutrition (Smith, Ramakrishnan, Ndiaye, Haddad, & Martorell, 2003) and food insecurity (von Grebmer et al., 2009), even as other determinants of food security, such as per capita incomes, have improved. Recent diagnostics using the WEAI in Bangladesh (Sraboni et al., 2014) show that women are most disempowered in terms of leadership in the community, control of resources and control of income. Household chores and care-giving activities are almost exclusively performed by women, whereas men are primarily engaged in agriculture. Despite increases in women's participation in agriculture in recent years (Asaduzzaman, 2010, citing Bangladesh Bureau of Statistics, various years), they have limited control over agricultural assets, what they produce, or the mobility to market the surplus, often relying on husbands and sons to take produce to market. Women in rural areas also lack the knowledge to feed and care for their children appropriately, and even if they had the knowledge, their lack of control of income and limited mobility (to buy nutritious foods from the market) undermines the nutritional outcomes.

The subordinate status of women in Bangladesh is deeply rooted in its culture of strong son preference (Ahmed, 1981), although recent evidence suggests this may be weakening (Adnan, 1998; Kabeer et al., 2013). Attempts to close the gender gap in the next generation through investments in human capital have had some success. Programmes to increase girls' schooling (Ahmed et al., 2011) have closed the gender gap in enrolment, with school attendance now being higher for girls than boys, according to the 2011 Bangladesh DHS (National Institute of Population Research and Training (NIPORT) et al., 2013).

4.2 | Data

We use data from the BIHS (Ahmed, 2013), which is nationally representative of rural Bangladesh. The survey was conducted from December 2011 to March 2012, a busy agricultural season for men but not women, who are mainly involved in post-harvest activities. Because we want to test whether spousal differences in empowerment affect child outcomes, we restrict our estimation samples to 3,213 farm households with valid WEAI responses from *both* the primary male and female decision-makers. Of these households, our final estimation samples include 3,156 households with 1,774 co-resident

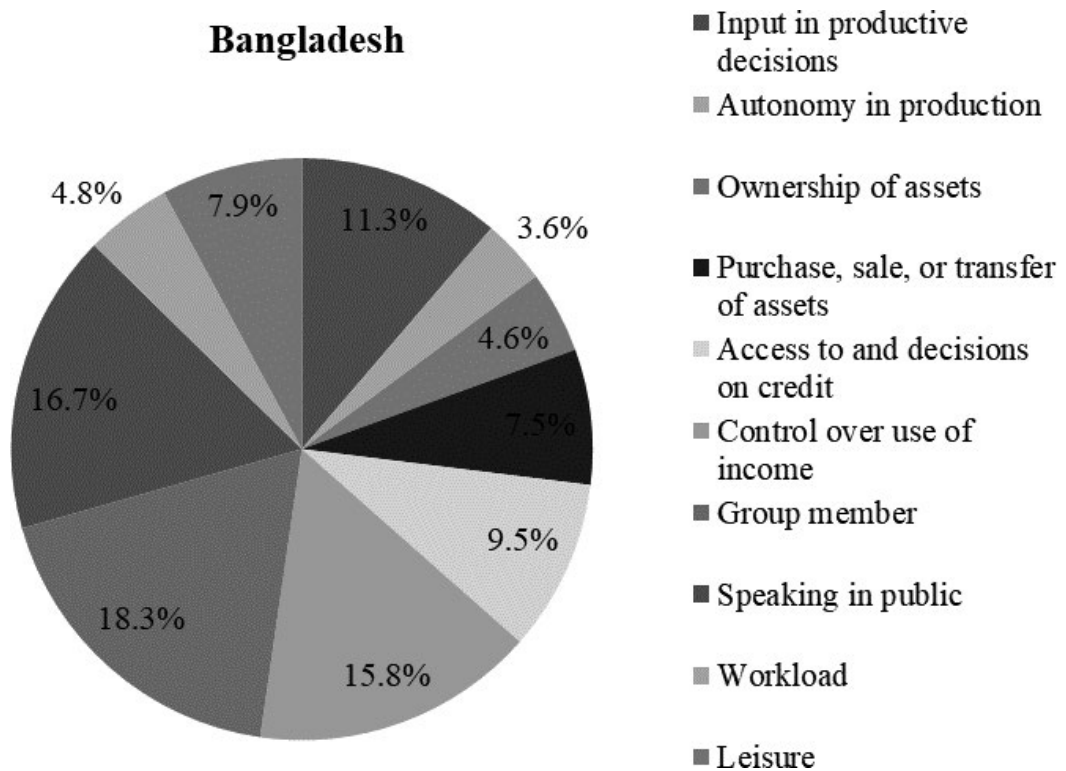


FIGURE 2 Contribution of Each of the 10 Domain Indicators to Disempowerment of Women

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

children under five, 2,308 co-resident children between six and 10 years old, and 1,911 co-resident children between 11 and 17 years old. Summary statistics of all the variables used are presented in Table 2.

4.3 | Dependent variables

Because investment in children's human capital is time-bound, corresponding to different "windows of opportunity," we focus on nutritional status for younger children and education for older children.

Nutritional status. For children under five years old, anthropometric height and weight information are used to construct height-for-age (HAZ) and weight-for-height (WHZ) z-scores, which are often used as indicators of long-term and short-term nutritional status, respectively. 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.

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. This measure prevents censoring owing to incomplete schooling completion and shows how well each child is doing relative to other children of the same age. We analyse education outcomes for two groups of co-resident children: primary school-age (6–10 years old) and secondary school-age children (11–17 years old). When schooling is measured in both years and in cohort deviations, girls significantly outperform boys (Table 2). This is in large part due to secondary scholarship programmes targeting girls, and the higher opportunity costs or foregone earnings of boys in the labour market.⁶

⁶Regressions using completed years of schooling as the dependent variable produced similar results and are not reported.

TABLE 3 Under Five Children's Height-for-Age Z-Scores and Measures of Male/Female Difference in Empowerment

Model	Dependent variable: height-for-age z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empowerment score	group membership	credit decisions	asset owner-ship	asset decisions	ladder score	satisfaction score
<i>Child characteristics</i>							
=1 if female	−0.024 (0.213)	−0.028 (0.211)	−0.007 (0.210)	−0.051 (0.234)	−0.045 (0.223)	−0.049 (0.212)	−0.044 (0.209)
=1 if under two	−0.442*** (0.155)	−0.454*** (0.155)	−0.454*** (0.155)	−0.444*** (0.154)	−0.448*** (0.155)	−0.446*** (0.155)	−0.445*** (0.155)
age in months	−0.087*** (0.012)	−0.088*** (0.012)	−0.088*** (0.012)	−0.087*** (0.012)	−0.087*** (0.012)	−0.087*** (0.012)	−0.088*** (0.012)
age in months squared	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
=1 if child of WEAI respondent	−0.117 (0.193)	−0.124 (0.194)	−0.127 (0.194)	−0.130 (0.194)	−0.131 (0.194)	−0.139 (0.194)	−0.132 (0.194)
<i>Empowerment measures</i>							
M/F difference in empowerment measure	−0.005 (0.205)	−0.097 (0.092)	0.057 (0.056)	0.005 (0.025)	−0.000 (0.006)	−0.009 (0.026)	−0.011 (0.020)
M/F difference in age	−0.020 (0.016)	−0.019 (0.016)	−0.021 (0.016)	−0.020 (0.016)	−0.020 (0.016)	−0.020 (0.016)	−0.020 (0.016)
M/F difference in education	0.001 (0.019)	0.001 (0.019)	−0.000 (0.019)	0.001 (0.020)	0.001 (0.020)	0.001 (0.019)	0.001 (0.019)
<i>Interaction of child sex with empowerment measures</i>							
female*M/F difference in empowerment	−0.242 (0.270)	0.091 (0.119)	−0.166** (0.075)	−0.001 (0.032)	−0.001 (0.007)	−0.008 (0.037)	−0.010 (0.026)
female*M/F difference in age	0.002 (0.019)	0.000 (0.019)	0.002 (0.019)	0.001 (0.019)	0.001 (0.019)	0.001 (0.019)	0.000 (0.019)
female*M/F difference in education	−0.015 (0.023)	−0.017 (0.023)	−0.014 (0.023)	−0.015 (0.023)	−0.016 (0.023)	−0.015 (0.023)	−0.017 (0.023)
<i>Household characteristics</i>							
age of household head	0.024 (0.021)	0.023 (0.021)	0.024 (0.021)	0.024 (0.021)	0.024 (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)

(Continues)

TABLE 3 (Continued)

Model	Dependent variable: height-for-age z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset owner- ship	asset decisions	ladder score	satisfac- tion score
education of household head	0.047*** (0.013)	0.048*** (0.013)	0.048*** (0.013)	0.047*** (0.013)	0.047*** (0.013)	0.048*** (0.013)	0.048*** (0.013)
household head is farmer	0.059 (0.098)	0.063 (0.098)	0.062 (0.098)	0.050 (0.100)	0.057 (0.098)	0.061 (0.099)	0.055 (0.098)
household head is trader	0.068 (0.111)	0.079 (0.111)	0.073 (0.110)	0.072 (0.112)	0.074 (0.111)	0.081 (0.110)	0.073 (0.111)
household size	-0.031 (0.029)	-0.033 (0.029)	-0.035 (0.029)	-0.033 (0.029)	-0.033 (0.029)	-0.032 (0.029)	-0.035 (0.029)
ln (owned cultivable land+1)	0.009 (0.028)	0.011 (0.028)	0.010 (0.028)	0.009 (0.028)	0.010 (0.028)	0.012 (0.028)	0.009 (0.028)
access to electricity	0.106 (0.077)	0.112 (0.076)	0.117 (0.077)	0.112 (0.076)	0.116 (0.076)	0.115 (0.076)	0.116 (0.076)
price of rice (in taka)	0.014 (0.013)	0.013 (0.013)	0.012 (0.013)	0.014 (0.013)	0.013 (0.013)	0.013 (0.013)	0.014 (0.013)
number of dairy cows owned	0.001 (0.035)	0.001 (0.035)	0.001 (0.035)	0.000 (0.035)	0.002 (0.035)	0.004 (0.035)	0.001 (0.035)
N	1,756	1,756	1,756	1,756	1,756	1,756	1,756
F	4.724	4.859	4.752	4.682	4.681	4.704	4.722

4.4 | Key independent variables⁷

We have three measures of relative bargaining power: (1) human resources brought to marriage, (2) empowerment measures from the WEAI, and (3) assessment of degree of influence in the community and satisfaction with power to make life-changing decisions.

Human resources brought to marriage. 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 (Miller, 1981; Cain, 1984). Education differences can

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

TABLE 4 Under Five Children's Weight-for-Height Z-Scores and Measures of Male/Female Difference in Empowerment

	Dependent variable: weight-for-height z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Model	empowerment score	group membership	credit decisions	asset owner-ship	asset decisions	ladder score	satisfaction score
<i>Child characteristics</i>							
=1 if female	0.071 (0.169)	0.121 (0.169)	0.059 (0.164)	0.152 (0.188)	0.104 (0.176)	0.067 (0.166)	0.078 (0.166)
=1 if under two	-0.228* (0.131)	-0.236* (0.132)	-0.220* (0.131)	-0.222* (0.131)	-0.230* (0.131)	-0.223* (0.132)	-0.210 (0.131)
age in months	-0.015 (0.011)	-0.015 (0.011)	-0.015 (0.011)	-0.014 (0.011)	-0.015 (0.011)	-0.014 (0.011)	-0.014 (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)
=1 if child of WEAI respondent	0.049 (0.164)	0.056 (0.165)	0.062 (0.165)	0.049 (0.165)	0.054 (0.164)	0.043 (0.165)	0.044 (0.164)
<i>Empowerment measures</i>							
M/F difference in empowerment measure	0.053 (0.175)	-0.115 (0.076)	0.050 (0.043)	0.014 (0.022)	-0.001 (0.005)	-0.018 (0.024)	-0.053*** (0.017)
M/F difference in age	0.011 (0.011)	0.011 (0.011)	0.010 (0.011)	0.011 (0.011)	0.011 (0.011)	0.011 (0.011)	0.012 (0.011)
M/F difference in education	0.012 (0.014)	0.014 (0.014)	0.012 (0.014)	0.011 (0.014)	0.012 (0.014)	0.012 (0.014)	0.015 (0.014)
<i>Interaction of child sex with empowerment measures</i>							
female*M/F difference in empowerment	0.002 (0.241)	0.172* (0.097)	0.027 (0.061)	-0.025 (0.028)	-0.003 (0.007)	0.009 (0.034)	0.047** (0.024)
female*M/F difference in age	-0.008 (0.013)	-0.010 (0.013)	-0.008 (0.013)	-0.008 (0.013)	-0.008 (0.013)	-0.009 (0.013)	-0.009 (0.013)
female*M/F difference in education	-0.024 (0.017)	-0.025 (0.017)	-0.024 (0.017)	-0.022 (0.018)	-0.024 (0.017)	-0.024 (0.017)	-0.027 (0.017)

(Continues)

TABLE 4 (Continued)

	Dependent variable: weight-for-height z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Model	empowerment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfaction score
<i>Household characteristics</i>							
age of household head	−0.003 (0.019)	−0.004 (0.019)	−0.003 (0.019)	−0.003 (0.019)	−0.003 (0.019)	−0.003 (0.019)	−0.003 (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)
education of household head	0.005 (0.010)	0.006 (0.010)	0.005 (0.010)	0.006 (0.011)	0.006 (0.010)	0.006 (0.010)	0.006 (0.010)
household head is farmer	0.100 (0.081)	0.110 (0.081)	0.096 (0.080)	0.097 (0.082)	0.108 (0.081)	0.107 (0.081)	0.096 (0.080)
household head is trader	0.012 (0.101)	0.017 (0.100)	0.017 (0.101)	0.006 (0.101)	0.013 (0.101)	0.018 (0.101)	0.013 (0.100)
household size	0.012 (0.028)	0.013 (0.028)	0.013 (0.028)	0.013 (0.029)	0.013 (0.028)	0.014 (0.028)	0.013 (0.028)
ln (owned cultivable land+1)	0.053** (0.026)	0.053** (0.026)	0.053** (0.026)	0.054** (0.026)	0.055** (0.026)	0.055** (0.026)	0.050* (0.026)
access to electricity	0.184*** (0.066)	0.179*** (0.066)	0.186*** (0.066)	0.180*** (0.066)	0.187*** (0.067)	0.181*** (0.066)	0.180*** (0.066)
price of rice (in taka)	0.016 (0.010)	0.016 (0.010)	0.017* (0.010)	0.016 (0.010)	0.016 (0.010)	0.016 (0.010)	0.017* (0.010)
number of dairy cows owned	−0.026 (0.032)	−0.027 (0.032)	−0.025 (0.032)	−0.027 (0.032)	−0.024 (0.032)	−0.024 (0.033)	−0.027 (0.032)
N	1,753	1,753	1,753	1,753	1,753	1,753	1,753
F	1.546	1.596	1.695	1.535	1.598	1.574	1.816

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Other control variables include household composition and division dummies.

also be viewed as a proxy for differences in earning power, which carries bargaining power (Sen, 1989). Human capital also indicates the empowerment of individuals more broadly,⁸ extending beyond the productive sphere. Married women in our sample are, on average, eight years younger than

⁸Although human capital may be endogenous to the result of marriage market selection or other unobservable characteristics, most husbands and wives in our sample complete schooling before marriage and thus parental human capital is exogenous to decisions undertaken *within* the marriage.

TABLE 5 Under Five Children's Weight-for-Age Z-Scores and Measures of Male/Female Difference in Empowerment

Model	Dependent variable: weight-for-age z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfac- tion score
<i>Child characteristics</i>							
=1 if female	0.012 (0.164)	0.035 (0.162)	-0.001 (0.163)	0.040 (0.177)	0.012 (0.169)	-0.009 (0.162)	-0.001 (0.160)
=1 if under two	-0.175 (0.117)	-0.189 (0.117)	-0.178 (0.117)	-0.175 (0.117)	-0.185 (0.117)	-0.176 (0.117)	-0.166 (0.116)
age in months	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.029*** (0.010)	-0.028*** (0.010)
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)
=1 if child of WEAI respondent	-0.027 (0.156)	-0.028 (0.157)	-0.030 (0.156)	-0.038 (0.156)	-0.034 (0.156)	-0.048 (0.157)	-0.042 (0.156)
<i>Empowerment measures</i>							
M/F difference in empower- ment measure	0.026 (0.162)	-0.136** (0.064)	0.043 (0.042)	0.009 (0.019)	-0.003 (0.004)	-0.017 (0.020)	-0.040** (0.016)
M/F difference in age	-0.006 (0.013)	-0.005 (0.013)	-0.006 (0.013)	-0.005 (0.013)	-0.006 (0.013)	-0.005 (0.013)	-0.005 (0.013)
M/F difference in education	0.004 (0.014)	0.005 (0.014)	0.003 (0.014)	0.003 (0.014)	0.005 (0.014)	0.004 (0.014)	0.006 (0.014)
<i>Interaction of child sex with empowerment measures</i>							
female*M/F difference in empowerment	-0.188 (0.216)	0.169** (0.083)	-0.048 (0.056)	-0.016 (0.024)	-0.002 (0.005)	-0.003 (0.028)	0.025 (0.021)
female*M/F difference in age	-0.005 (0.015)	-0.007 (0.015)	-0.006 (0.015)	-0.006 (0.015)	-0.006 (0.015)	-0.006 (0.015)	-0.007 (0.015)
female*M/F difference in education	-0.020 (0.017)	-0.023 (0.016)	-0.021 (0.016)	-0.020 (0.017)	-0.022 (0.017)	-0.021 (0.016)	-0.023 (0.016)
<i>Household characteristics</i>							
age of household head	0.008 (0.018)	0.007 (0.018)	0.008 (0.018)	0.009 (0.018)	0.008 (0.019)	0.008 (0.018)	0.008 (0.018)
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)

(Continues)

TABLE 5 (Continued)

Model	Dependent variable: weight-for-age z-scores						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empowerment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfaction score
education of household head	0.031*** (0.009)	0.031*** (0.009)	0.030*** (0.009)	0.031*** (0.009)	0.031*** (0.009)	0.031*** (0.009)	0.031*** (0.009)
household head is farmer	0.119 (0.074)	0.128* (0.074)	0.118 (0.074)	0.114 (0.075)	0.128* (0.074)	0.125* (0.074)	0.113 (0.074)
household head is trader	0.046 (0.081)	0.057 (0.081)	0.052 (0.081)	0.046 (0.082)	0.054 (0.081)	0.060 (0.081)	0.050 (0.081)
household size	-0.001 (0.025)	-0.001 (0.025)	-0.002 (0.025)	-0.002 (0.025)	-0.002 (0.024)	-0.000 (0.025)	-0.003 (0.025)
ln (owned cultivable land+1)	0.040** (0.020)	0.041** (0.021)	0.041** (0.020)	0.041** (0.021)	0.043** (0.020)	0.043** (0.020)	0.038* (0.020)
access to electricity	0.196*** (0.058)	0.198*** (0.058)	0.204*** (0.058)	0.200*** (0.058)	0.209*** (0.058)	0.201*** (0.058)	0.201*** (0.058)
price of rice (in taka)	0.017** (0.009)	0.016* (0.009)	0.017* (0.009)	0.017* (0.009)	0.016* (0.009)	0.017* (0.009)	0.018** (0.009)
number of dairy cows owned	-0.023 (0.028)	-0.024 (0.028)	-0.023 (0.029)	-0.024 (0.029)	-0.020 (0.028)	-0.020 (0.029)	-0.024 (0.028)
N	1,774	1,774	1,774	1,774	1,774	1,774	1,774
F	4.611	4.900	4.620	4.581	4.732	4.662	4.784

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Other control variables include household composition and division dummies.

their spouses (Table 2). 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 10 indicators (Table 1). In line with other studies that have analysed the WEAI (Sraboni et al., 2014; Malapit & 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 policy-makers 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 empowerment measures.

A decomposition of the WEAI indicators (Sraboni et al., 2014) shows that the *leadership* and *resources* domains contribute the most to women's disempowerment in rural Bangladesh (Figure 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 2).

TABLE 6 Education, Deviation from Cohort Means, Co-Resident Children Aged 6–10

Model	Dependent variable: education, deviation from cohort means, co-resident children 6–10						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfac- tion score
<i>Child characteristics</i>							
=1 if female	0.097 (0.092)	0.107 (0.090)	0.102 (0.090)	0.055 (0.103)	0.022 (0.098)	0.099 (0.090)	0.101 (0.090)
age in years	−0.095 (0.153)	−0.087 (0.153)	−0.091 (0.153)	−0.087 (0.153)	−0.085 (0.153)	−0.091 (0.154)	−0.091 (0.153)
age in years squared	0.006 (0.010)	0.006 (0.010)	0.006 (0.010)	0.005 (0.010)	0.005 (0.010)	0.006 (0.010)	0.006 (0.010)
=1 if child of WEAI respondent	0.181** (0.085)	0.185** (0.085)	0.181** (0.085)	0.185** (0.085)	0.183** (0.084)	0.184** (0.085)	0.185** (0.085)
<i>Empowerment measures</i>							
M/F difference in empow- erment measure	0.038 (0.102)	0.050 (0.043)	0.005 (0.028)	0.001 (0.011)	−0.004* (0.003)	−0.008 (0.015)	−0.008 (0.010)
M/F difference in age	−0.004 (0.007)	−0.004 (0.007)	−0.004 (0.007)	−0.004 (0.007)	−0.004 (0.007)	−0.004 (0.007)	−0.004 (0.007)
M/F difference in education	−0.002 (0.008)	−0.001 (0.008)	−0.002 (0.008)	−0.001 (0.008)	−0.001 (0.008)	−0.001 (0.008)	−0.001 (0.008)
<i>Interaction of child sex with empowerment measures</i>							
female*M/F difference in empower- ment	0.079 (0.141)	0.014 (0.061)	0.019 (0.036)	0.015 (0.014)	0.008** (0.003)	0.019 (0.019)	0.008 (0.014)
female*M/F difference in age	−0.002 (0.008)	−0.002 (0.008)	−0.002 (0.008)	−0.002 (0.008)	−0.002 (0.008)	−0.002 (0.008)	−0.002 (0.008)
female*M/F difference in education	−0.023** (0.011)	−0.024** (0.011)	−0.023** (0.011)	−0.024** (0.011)	−0.025** (0.011)	−0.024** (0.011)	−0.024** (0.011)
<i>Household characteristics</i>							
age of household head	−0.001 (0.012)	−0.001 (0.012)	−0.001 (0.012)	−0.002 (0.013)	−0.002 (0.012)	−0.001 (0.013)	−0.001 (0.012)

(Continues)

TABLE 6 (Continued)

Model	Dependent variable: education, deviation from cohort means, co-resident children 6–10						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfac- tion score
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)
education of household head	0.029*** (0.006)	0.027*** (0.006)	0.029*** (0.006)	0.029*** (0.006)	0.029*** (0.006)	0.029*** (0.006)	0.029*** (0.006)
household head is farmer	0.136*** (0.044)	0.132*** (0.044)	0.135*** (0.044)	0.129*** (0.045)	0.136*** (0.044)	0.138*** (0.044)	0.139*** (0.044)
household head is trader	0.174*** (0.060)	0.168*** (0.060)	0.169*** (0.060)	0.168*** (0.060)	0.171*** (0.060)	0.169*** (0.060)	0.169*** (0.060)
household size	0.003 (0.012)	0.004 (0.012)	0.003 (0.012)	0.003 (0.012)	0.005 (0.012)	0.003 (0.012)	0.004 (0.012)
ln (owned cultivable land+1)	0.035** (0.014)	0.035** (0.014)	0.036** (0.014)	0.034** (0.014)	0.036** (0.014)	0.036** (0.014)	0.036** (0.014)
access to electricity	0.093** (0.038)	0.090** (0.038)	0.091** (0.038)	0.088** (0.038)	0.088** (0.038)	0.091** (0.038)	0.091** (0.038)
price of rice (in taka)	0.005 (0.006)	0.004 (0.006)	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)
number of dairy cows owned	0.001 (0.015)	−0.001 (0.015)	0.000 (0.015)	−0.002 (0.015)	0.001 (0.015)	0.000 (0.015)	0.000 (0.015)
N	2,308	2,308	2,308	2,308	2,308	2,308	2,308
F	4.634	4.650	4.608	4.650	4.719	4.635	4.638

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Other control variables include household composition and division dummies.

However, the credit indicator may be problematic because the survey questions do not distinguish between non-borrowers who are truly credit constrained from those who have sufficient liquidity and therefore choose not to borrow (Sraboni et al., 2014). Following Sraboni et al. (2014), we also analyse the two other indicators for the resources domain, namely, *asset ownership* and *rights over assets*. Using this information, we use the following alternative measures of relative empowerment:

Model 1: Empowerment score. The difference between the individual-level empowerment scores of the primary male and female respondents in the household. Higher numbers indicate a larger gap between male and female empowerment favouring males, and zero indicates perfect equality. The individual-level empowerment score, which reflects overall empowerment in agricultural production, is the weighted average of an individual's achievements in the 10 indicators that comprise the five

TABLE 7 Education, Deviation from Cohort Means, Co-Resident Children Aged 11–17

Model	Dependent variable: education, deviation from cohort means, co-resident children 11–17						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfac- tion score
<i>Child characteristics</i>							
=1 if female	0.582*** (0.202)	0.576*** (0.204)	0.567*** (0.203)	0.428* (0.229)	0.405* (0.214)	0.569*** (0.203)	0.567*** (0.203)
age in years	−0.040 (0.690)	−0.037 (0.690)	−0.094 (0.690)	−0.108 (0.691)	−0.087 (0.691)	−0.113 (0.691)	−0.034 (0.694)
age in years squared	0.002 (0.027)	0.002 (0.027)	0.005 (0.027)	0.005 (0.027)	0.004 (0.027)	0.005 (0.027)	0.002 (0.027)
=1 if child of WEAI respondent	0.728*** (0.228)	0.745*** (0.229)	0.748*** (0.230)	0.759*** (0.231)	0.764*** (0.230)	0.739*** (0.229)	0.742*** (0.231)
<i>Empowerment measures</i>							
M/F difference in empower- ment measure	−0.443* (0.251)	−0.154 (0.105)	−0.037 (0.069)	0.005 (0.026)	−0.006 (0.006)	−0.055 (0.035)	0.019 (0.025)
M/F difference in age	0.001 (0.015)	0.001 (0.015)	0.001 (0.015)	0.001 (0.015)	−0.000 (0.015)	0.002 (0.015)	0.001 (0.015)
M/F difference in education	−0.098*** (0.024)	−0.102*** (0.024)	−0.098*** (0.024)	−0.097*** (0.024)	−0.098*** (0.023)	−0.096*** (0.024)	−0.101*** (0.024)
<i>Interaction of child sex with empowerment measures</i>							
female*M/F difference in empower- ment	−0.165 (0.338)	0.024 (0.132)	−0.011 (0.086)	0.037 (0.033)	0.014 (0.008)	0.019 (0.045)	−0.017 (0.031)
female*M/F difference in age	−0.000 (0.017)	−0.002 (0.017)	−0.002 (0.017)	−0.001 (0.017)	−0.000 (0.017)	−0.003 (0.017)	−0.002 (0.017)
female*M/F difference in education	0.013 (0.026)	0.013 (0.026)	0.012 (0.026)	0.011 (0.026)	0.010 (0.026)	0.010 (0.026)	0.014 (0.026)
<i>Household characteristics</i>							
age of household head	0.087** (0.043)	0.087** (0.043)	0.086* (0.044)	0.086* (0.044)	0.086** (0.043)	0.090** (0.043)	0.088** (0.044)

(Continues)

TABLE 7 (Continued)

Model	Dependent variable: education, deviation from cohort means, co-resident children 11–17						
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	empower- ment score	group membership	credit decisions	asset ownership	asset decisions	ladder score	satisfac- tion score
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* (0.000)	−0.001* (0.000)
education of household head	0.146*** (0.014)	0.149*** (0.014)	0.145*** (0.014)	0.143*** (0.014)	0.144*** (0.014)	0.146*** (0.014)	0.145*** (0.014)
household head is farmer	0.290*** (0.103)	0.287*** (0.103)	0.276*** (0.103)	0.240** (0.105)	0.266** (0.104)	0.288*** (0.102)	0.273*** (0.102)
household head is trader	0.376*** (0.129)	0.404*** (0.129)	0.401*** (0.129)	0.398*** (0.129)	0.398*** (0.129)	0.411*** (0.129)	0.399*** (0.129)
household size	0.016 (0.032)	0.015 (0.032)	0.019 (0.032)	0.017 (0.032)	0.017 (0.032)	0.017 (0.032)	0.018 (0.032)
ln (owned cultivable land+1)	0.045 (0.031)	0.042 (0.031)	0.038 (0.031)	0.033 (0.031)	0.035 (0.031)	0.040 (0.031)	0.037 (0.031)
access to electricity	0.469*** (0.089)	0.472*** (0.089)	0.478*** (0.089)	0.469*** (0.089)	0.473*** (0.090)	0.483*** (0.089)	0.475*** (0.089)
price of rice (in taka)	0.022 (0.014)	0.022 (0.015)	0.019 (0.014)	0.019 (0.014)	0.020 (0.014)	0.019 (0.014)	0.019 (0.014)
number of dairy cows owned	0.054 (0.036)	0.060* (0.036)	0.056 (0.036)	0.050 (0.036)	0.055 (0.036)	0.059* (0.036)	0.055 (0.036)
N	1,911	1,911	1,911	1,911	1,911	1,911	1,911
F	14.153	14.100	14.071	14.233	14.229	14.255	14.015

Note. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Robust standard errors in parentheses. Other control variables include household composition and division dummies.

domains of empowerment in agriculture, ranging from zero to one and is increasing in empowerment. Men have higher empowerment scores than women on average and are empowered in four out of five domains in agriculture, compared to three for women (Table 2).

Model 2: (Leadership domain) Group membership. 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 (Table 2), 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. 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 decisions to borrow and 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 (non-governmental organization (NGO), informal, formal, friends/family and rotating savings and credit associations) so as not to assign greater empowerment to those who approach multiple types of lenders. On average, men take twice as many decisions on credit than women (Table 2).

Model 4: (Resources domain) Asset ownership. 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 in our sample (Table 2), reflecting women's poor access to resources in Bangladesh.

Model 5: (Resources domain) Rights over assets. The male/female difference in the number of sole or joint decisions concerning purchase/sale/transfer of assets taken respondents, 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. More decisions over more asset types implies greater rights over assets and therefore higher empowerment. Men are also more likely to take decisions regarding assets, as reflected by the higher number of self/joint decisions over assets made by men (22) compared to women (11) (Table 2).

Measures of influence and satisfaction with power to make life-changing decisions. The remaining two indicators are not part of the WEAI, but were included in the piloting of the instrument as robustness checks for the WEAI indicators. We include them because they capture aspects of bargaining power and agency outside agriculture.

Model 6: Ladder score. 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 influence in the community beyond the agricultural sector. In our sample, women are less likely to feel that they have some influence in the community, with lower average scores than men. However, both men and women have very low scores on average, suggesting that both perceive a lack of influence in the community, which could translate into less bargaining power within the household, if influence in the community affects household decision-making.

Model 7: Satisfaction score. The male/female difference in the respondents' self-assessments regarding their satisfaction with their power to make life-changing decisions (10-point scale). Higher scores indicate greater satisfaction with decision-making power. These subjective assessments reflect individuals' perceived ability to determine the course of their life, and indicate empowerment beyond the productive sphere of agriculture. Men have higher satisfaction scores on average compared with women, although the difference is small (Table 2).

5 | RESULTS

We present key results for our OLS estimates for children under five's HAZ, WHZ and WAZ, education deviations for children aged 6–10, and education deviations for children aged 11–17 in Tables 3–7, respectively. Because we cannot control for endogeneity of the empowerment measures, these results should be interpreted as associative rather than causal.

5.1 | Children's nutritional status

Children's HAZ, WHZ and WAZ appear to be only weakly correlated with relative bargaining power in the household (Tables 3–5).⁹ In the HAZ regressions (Table 3), none of the empowerment coefficients across the seven models are significant, except in the credit decisions specification (Model 3), where the relative empowerment coefficient for girls is significant and negative. This implies that when credit decision-making favours 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), the strongest results are in the satisfaction score specification (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 women's satisfaction with decision-making power relative to their husband's is associated with higher weight-for-height for boys, but less so for girls. Given the predominance of son preference in rural Bangladesh, it may be the case that the women with higher satisfaction with decision-making power invest more in their sons' (rather than daughters') nutrition. In the group membership specification (OLS model 2), the coefficient on gender gap in group membership has an unexpectedly weak significant positive coefficient for girls. It appears that higher involvement in groups by women relative to men is associated with lower girls' WHZ, contrary to our expectations. This result could point to excessive demands on women's time owing to participation in group activities, a possible backlash from men within the household, or the targeting of NGOs to poorer groups. These alternative explanations need further investigation.

In the WAZ regressions (Table 5), the gender gap in group membership (Model 2) and satisfaction score (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 satisfaction with decision-making power 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 favour boys rather than girls, perhaps reflecting the desire of mothers to invest in boys' health.

While 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 3 and 5). This may be reflecting a "wealth" effect, where households with a well-educated head are also more likely to have sufficient resources to invest in children's nutrition, especially as indicated by height-based measures.

5.2 | Children's education

For younger children between six and 10 years old (Table 6), a relative increase in women's asset decision-making is weakly correlated with better schooling outcomes for boys relative to their age cohort. 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 negative association between spousal education gaps and girls' schooling relative to the cohort mean, implying that girls in households with smaller disparities in spousal education are also more likely to have better education outcomes.

⁹In interpreting these results, it must be noted that HAZ, WHZ and WAZ reflect different biological processes. Poor WHZ scores reflect the effects of food shortages or disease in the short term, while low HAZ scores reflect long-term insufficient nutrient intake and frequent infections. WAZ is a composite of WHZ and HAZ, so includes the influence of short- and long-term factors.

Narrowing the gender gap in overall empowerment scores is more likely to increase education for both boys and girls between 11 and 17 years old (Table 7, Model 1). Across all specifications, households where the primary female is more educated are also more likely to have more educated boys and girls, with much larger magnitudes of the association for older children (Table 7) compared with younger girls (Table 6). This might suggest that, controlling for household wealth and husband characteristics, better-educated women are able to negotiate in favour of keeping children in school until they are older. Better-educated mothers are more likely to be able to choose more appropriate educational inputs: for example, by motivating their children to remain in school by personally engaging with their studies and providing an intellectual environment conducive to education (Behrman, 1997).

For both age groups of children, the education of the household head significantly predicts children's education outcomes, although the magnitudes of the effects are much higher for older children. Relative to their peers, older children are more likely to stay in school longer if the household head is better educated. 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.

6 | CONCLUSIONS AND POLICY IMPLICATIONS

Using a household bargaining framework, our analysis provides empirical evidence on the relationship between empowerment gaps between men and women in the same household and children's nutrition and education outcomes in rural Bangladesh.

We find that intrahousehold 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 decision-making over credit is associated with improvements in girls' nutritional status (HAZ), while women's satisfaction with the power to make important decisions and participation in groups are positively associated with improvements in boys' nutritional status (WHZ, WAZ). Increasing the number of asset-related decisions that women make appears to favour primary school-age boys. Younger girls aged 6–10 and older boys and girls aged 11–17 complete more years of schooling relative to their peers when women are more educated. Overall, the (male) household head's education is significantly associated with better nutrition and education outcomes for children. The results on schooling suggest that men's education may be reflecting a "wealth" effect that is invested in children's nutrition and education when they are young, while mothers' schooling, is more important in keeping children in school.

Our mixed findings on the association between child well-being outcomes and relative bargaining power suggest that there may be more consensus between spouses over investments in children's nutrition, especially for boys. Perhaps this reflects son preference of both husband and wife, as well as the dependence of women on adult sons in their old age. There appears to be less spousal agreement over investments in girls' schooling, where women's own education exerts a significant influence. Women's overall empowerment and own education are especially significant in increasing schooling for secondary school-age children, which suggests that both girls and boys are kept in school, and out of the labour force or marriage market, for longer. This is consistent with the literature documenting a strong positive association between women's status and improvements in children's education. Given the importance of schooling for future outcomes of boys and girls alike, this result provides another rationale for policies and interventions that improve women's bargaining position in the household.

Our findings, viewed together with similar mixed results from studies in other contexts examining the links between women's empowerment in agriculture and child nutrition (Malapit et al., 2015,

Malapit & Quisumbing, 2015), suggest that the domains of empowerment that are significant for children's education and nutrition outcomes may not always overlap. Additionally, they suggest that empowerment in some dimensions is perhaps more instrumentally powerful than others.¹⁰ This highlights a potential shortcoming of our present study: assessing the top contributors to women's disempowerment may not provide a complete picture of the ways in which women's empowerment in agriculture may improve nutritional outcomes. A future avenue of research would be to examine the association of all the indicators with child welfare outcomes. Moreover, the highly significant associations with the satisfaction with decision-making power score, for example, suggest that a broader conceptualization of empowerment that goes beyond agriculture may be warranted. As part of the Gender, Agriculture, and Assets Project, Phase 2 (GAAP2), we are now developing a suite of empowerment indicators that more explicitly consider dimensions of empowerment related to health and nutrition.

Our results also strongly suggest that closing empowerment gaps within the household, or reducing intrahousehold inequality more generally, has positive associations with children's nutrition and schooling. This implies that policies and interventions to empower women, whether by increasing the number and value of assets that they control, increasing decision-making power over those assets, strengthening access to and decision-making power over financial resources (credit and savings accounts), and increasing options to exercise leadership in their communities through group membership are important. At the same time, policy-makers and programme designers need to be aware of unintended consequences, such as increased workload and the potential backlash against women. This means that efforts to reach women must be accompanied by programming to change gender norms, by reaching out to husbands, key household members (such as mothers-in-law in the Bangladeshi context) and communities. A promising example is the Nurturing Connections curriculum, a participatory curriculum for women, men, their families and communities to explore gender issues within agriculture, nutrition and health developed in Bangladesh by Helen Keller International in 2013, and subsequently adapted for use in West Africa (Helen Keller International Bangladesh, 2015). The strong results for women's education also point to the need to continue supporting female education, as the Government of Bangladesh has done through innovative stipend and conditional cash transfer programmes. Finally, if these efforts to support women's empowerment and ability to make life-changing decisions result in improved nutrition and schooling, particularly for girls, they will contribute to improvements in gender equality across generations.

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¹⁰The lack of a relationship between some of the empowerment indicators and child welfare outcomes could reflect some of the underlying methodological limitations. For example, the lack of a clear relationship between assets and nutritional outcomes could be partly attributed to how ownership of assets is defined as the number of assets owned rather than the value of the assets. Consequently, the results could be driven by the ownership of many assets of relatively low value.

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