The Impact of Mother's Bargaining Power on the Nutritional Status of Children in Indonesia

Ahmad Yeyen Fidyani
Postgraduate Program in Economics, Faculty of Economics and Business, Universitas Indonesia & BPS-Statistics Indonesia, fidyani@bps.go.id

Arief Anshori Yusuf
Padjadjaran University, Indonesia, efi@lpem-feui.org

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Ahmad Yeyen Fidyani[a], and I Dewa Gede Karma Wisana[b,*]

[a] Postgraduate Program in Economics, Faculty of Economics and Business, Universitas Indonesia & BPS-Statistics Indonesia
[b] Demographic Institute, Faculty of Economics and Business, Universitas Indonesia

Abstract

Poor nutritional status, especially during childhood, has a negative impact on one's early life as well as throughout their life. One of the factors that influences the improvement of children's nutritional status is the bargaining power of the mother. Previous studies have limitations in that they often use cross-sectional data and indirect approaches to measuring bargaining power. This study aims to measure the impact of maternal bargaining power on children's nutritional status in Indonesia. The unit of analysis is children aged 7–19 years (IFLS5) who still have and live with their parents (IFLS4). Using the OLS estimation method, the results show that maternal bargaining power significantly and positively influences the nutritional status of children (HA z-score).

1. Introduction

One of the factors that determines the success of development and the competitiveness of a country is the quality of its human resources, in terms of both capability and productivity. A country rich in natural resources but without the support of quality human resources will face difficulties in achieving its full potential. Therefore, ensuring qualified human resources is central to supporting the success of development and competitiveness of a country. The nutritional adequacy of every human being is one of the factors that determines the quality of human resources. Poor nutritional status, especially during childhood, has a negative impact on one's early life and throughout their life. Therefore, increasing the nutritional status of children as economic successors is imperative for Indonesia to improve the quality of its human resources. A healthy child is an investment in human capital, as the nutritional status of children in the present can determine the quality of their life in the future. Victora et al. (2008) found that poor nutritional status in childhood has a negative impact on children's health and development in the future, including cognitive development disorders, reduced economic productivity, increased risks related to maternal reproduction such as maternal mortality or giving birth to underweight babies, and increased risk of noncommunicable diseases. Reviewing studies on the relationship of stunting and malnutrition in childhood with economic outcomes in adulthood, McGovern et al. (2017) concluded that children who are stunted or malnourished will suffer negative effects on various economic outcomes such as productivity, employment opportunity, and wages.

The indicators of the nutritional status of children in Indonesia remain concerning. This can be seen from the number of children with malnutrition in Indonesia which is above the maximum limit set by

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*Corresponding Address: Demographic Institute, Faculty of Economics and Business, Universitas Indonesia. Nathanael Iskandar Building Fl. 2 & 3 Universitas Indonesia Campus, Depok 16424. Email: dewawisa@ui.ac.id.

the World Health Organization as shown in Figure 1 (Ministry of Health 2019). This calls for serious efforts to improve the nutritional status of children in Indonesia. One important factor in the nutritional status of children is the parents of the children themselves, especially the mother because traditionally it is the mother who is responsible for the domestic affairs such as taking care of the children, while the father is expected to earn money for the family. The role of mothers in the effort to raise healthy children with a good nutritional status can be in the form of household decisions commonly referred to as bargaining power or maternal autonomy. Previous studies have shown that maternal bargaining power has a relationship with the nutritional status of children (Dasgupta 2016; Debnath & Bhattacharjee 2016; Imai et al. 2014; Kamiya et al. 2018; Kunto & Bras 2018; Lépine & Strobl 2013; Patel et al. 2007; Rajaram et al. 2017; Shroff et al. 2009; Sinha et al. 2017) and other indicators of children's health such as child health care (Grabowski & Self 2013), child immunization coverage (Ebot 2015), and the risk of child mortality (Adhikari & Sawangdee 2011; Hossain 2015; Memiah et al. 2019).

These studies have limitations in that they use cross-sectional data, whereas nutritional status, especially stunting, is an accumulation of nutritional status from the previous period. In addition, bargaining power is a process (Hossain 2015), making measuring its causal relationship with the nutritional status of children or other indicators of children's health using cross-sectional data less precise (Adhikari & Sawangdee 2011; Ebot 2015; Kamiya et al. 2018; Lépine & Strobl 2013; Memiah et al. 2019; Sinha et al. 2017). The use of longitudinal data, on the other hand, will result in more precise measurement of this relationship and enable the study of the long-term impact on the nutritional status of children throughout their life (Ebot 2015; Lépine & Strobl 2013; Memiah et al. 2019). This study aims to investigate the impact of maternal bargaining power on the nutritional status of children in Indonesia. The results of this study are expected to extend the literature on maternal bargaining power in im-

proving the quality of children's nutrition, especially in Indonesia.

2. Literature Review

2.1. Concepts and Definitions

Nutritional status is a condition that reflects the health of a person's body which can be measured or assessed as a result of the consumption, absorption, and utilization of food substances, so it can be seen whether or not a person has a good nutritional status. One way to assess and predict a person's nutritional status is using anthropometry or by measuring a person's body. Anthropometry result is presented in the form of an index using measures/variables such as height, weight, age, and upper arm circumference. Because it is more helpful to evaluate child growth and nutritional status as an adult, the variables of height and weight are often used in anthropometry. There are three indices in determining a person's nutritional status based on these variables, namely weight according to height (WH), weight according to age (WA), and height according to age (HA). In this study the authors use the HA index (stunting) as the nutritional status of children because it is an accumulation of nutritional status from the previous period so that the development of the nutritional status of children between surveys can be traced using longitudinal data. The authors also use the z-score to calculate the HA index because it is a commonly used method to express a person's HA index.

While maternal bargaining power or also called autonomy, status, position, or role (Beegle, Frankenberg & Thomas 2001; Bloom, Wypij & Gupta 2001; Dyson & Moore 1983) is defined as the mother's ability to influence decisions about herself or the immediate household members, to control economic and information resources, and to move freely (Bloom, Wypij & Gupta 2001; Dyson & Moore 1983). Anderson & Eswaran (2009) argue that maternal autonomy is usually defined as the ability of the mother to make choices/decisions in the house-
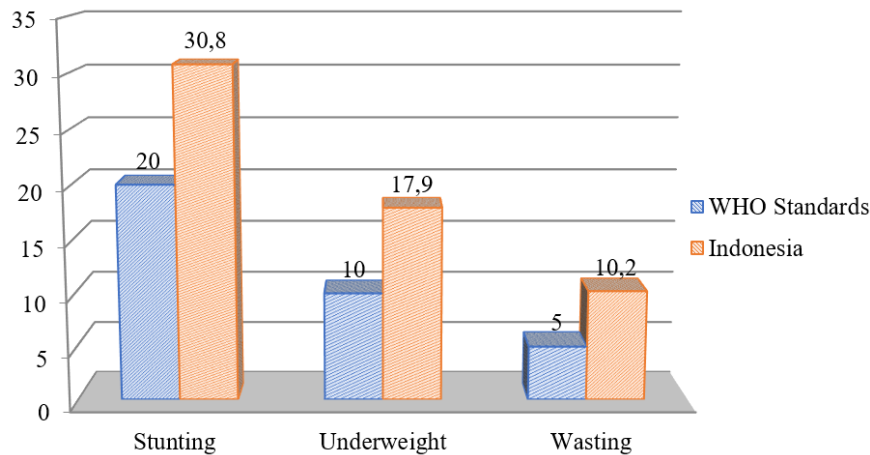
Figure 1. Prevalence of Malnutrition in Indonesia (percent)
Source: Basic Health Research (Riskesdas) 2018, Ministry of Health (2019)

hold relative to her husband. Direct indicators of maternal autonomy include the role of the mother in household decision making as measured by the extent to which she is involved in household decision making. The more decisions made by the mother in a household, the higher the maternal autonomy or bargaining power in the household. Although several studies have shown that maternal bargaining power has a positive impact on improving children's nutritional status, these studies have limitations, as they often use indirect proxies to measure bargaining power. Commonly used proxies revolve around measures of maternal economic ownership such as income, prepaid income (pension, insurance claims, or savings interest), inheritance, assets received from marriage (dowry), and current assets (Browning et al. 1994; Quisumbing 1994; Schultz 1990; Thomas 1990). There is a new direct indicator that can be used to measure bargaining power (Kishor 2000), namely through several questions such as who makes decisions in the household regarding resource control and other decision-making aspects.

2.2. Theoretical Framework

Although this study focuses on the mother's decision as a result of the mother's bargaining power, it is possible that the father's decision also has an effect, at least on how many decisions the mother

makes. Therefore, the theoretical arguments will discuss the extent to which maternal bargaining power influences children's nutritional status based on the intrahousehold bargaining model as summarized by Imai et al. (2014). There are several assumptions in this model, namely (1) children are a public good for both parents; (2) children are not the decision makers in the household, but parents care about the nutritional status of their children by making decisions for themselves respectively; and (3) each parent chooses consumption with their respective preferences to maximize the children's nutritional status as an effort to maximize utility (Maitra 2004; Park 2007). For example, a household consists of a mother (m), a father (f) and a number of children (n), $\mathrm{x_j}$ is the consumption of both parents $(\mathrm{j = m, f})$ and g is the (average) nutritional status of the children. Then, the utility of the j person is defined as $\mathrm{U_j = (x_j, g | A_j)}$, where $\mathrm{A_j}$ is the extra-household environmental parameters (EEP), namely a vector consisting of exogenous factors that determine individual preferences j. In this model, the household utility function is defined as $\theta \mathrm{U_m(x_m, g_m; A_m)} + (1 - \theta)\mathrm{U_f(x_f, g_f; A_f)}$ where θ represents the bargaining power of the mother in a household $(0 \leq \theta \leq 1)$. To maximize their utility through the nutritional status of their children, both parents are faced with obstacles in the form of household income. Therefore, the problem of

maximizing household utility can be formulated as follows:

$$
\begin{aligned}
\max_{x_m, x_j, g} U^H \;=\;& \theta U_m(x_m, g_m; A_m) \\
& + (1-\theta)U_f(x_f, g_f; A_f) \text{ s.t.} \\
& I = p_m x_m + p_f x_f + p_c g \qquad (1)
\end{aligned}
$$

Where I is the household income, p_j is the commodity price for the mother or father, and p_c is the shadow price of the public good in this case the children, while g is the children's nutritional status which is a function of g_m (nutritional status of children based on the mother's perception) and g_f (nutritional status of children based on the father's perception) or $g = f(g_m, g_f)$. The Lagrangian equation that can be formed from the maximization problem is:

$$
\begin{aligned}
\mathcal{L} \;=\;& \theta U_m(x_m, g_m; A_m) + (1-\theta)U_f(x_f, g_f; A_f) \\
& + \lambda[I - p_m x_m - p_f x_f - p_c f(g_m, g_f)] \qquad (2)
\end{aligned}
$$

From the above equation, a decision variable ($g*$) can be made to maximize utility which is a function of all exogenous variables, in this case variables $\theta, A_m, A_f, I, p_m, p_f$ and p_c.

$$
g* = f(\theta, A_m, A_f, I, p_m, p_f, p_c) \qquad (3)
$$

The focus of this research is how maternal bargaining power affects the nutritional status of children. However, Equation (3) cannot explain the causal relationship between the bargaining power of the mother and the nutritional status of the children ($\frac{\partial g*}{\partial \theta} = ?$), be it positive, negative or no relationship.

2.3. Previous Research

Several studies have investigated the effects of maternal bargaining power on the nutritional status of children. However, their results remain inconclusive due to the differing measurement methods (i.e., bargaining power of the mother, nutritional status of the child, and estimation method) used in each study. Studies that found a strong, positive relationship between maternal bargaining power and children's nu-

tritional status include Dasgupta (2016), Debnath & Bhattacharjee (2016), Kunto & Bras (2018), Lépine & Strobl (2013), Rajaram et al. (2017), and Sinha et al. (2017). Bargaining power in these studies was measured by asking the extent to which a mother participates in the household decision-making process regarding the purchase of household daily necessities, children's health, cooked food, and so on (Dasgupta 2016; Lépine & Strobl 2013; Rajaram et al. 2017). Other studies (Debnath & Bhattacharjee 2016; Kunto & Bras 2018; Sinha et al. 2017) use several indicators to measure bargaining power such as control over income, household level decision making, personal level decision making, respect for the mother in the household, freedom of movement, maternal education, and employment status or economic independence of the mother. For the variable nutritional status of children, these studies use the WH index z-score (Dasgupta 2016), mid upper arm circumference (Lépine & Strobl 2013), and HA and BMI (Kunto & Bras 2018). Because these variables use numerical data, the three studies use the OLS estimation method. Other studies use logistic regression analysis by categorizing the nutritional status of children into stunting (Sinha et al. 2017), and underweight and wasting (Debnath & Bhattacharjee 2016; Rajaram et al. 2017).

Some of these studies provide reasons justifying the use of certain variables for maternal bargaining power. For example, an indicator of freedom of movement that makes it easier for the mother to go to the market more freely without having to ask the husband's permission to buy good food for their children, not just the type of food to be cooked, can be used as a proxy for maternal bargaining power. Likewise, indicators of control over income and employment status or economic independence of the mother means that she is not dependent on income or money given by her husband to spend on something related to the children's health.

Several other studies found mixed effects, that is, some bargaining power measurements have a positive effect on the nutritional status of certain children, but other measurements are not statistically

significant (Imai et al. 2014; Kamiya et al. 2018; Shroff et al. 2009), or even have a negative effect on the nutritional status of children (Patel et al. 2007). Measuring bargaining power can be done using various methods, for example by asking the two partners about who makes the decision on the type of food to be bought or cooked (Patel et al. 2007), or using several indicators such as the mother's educational attainment relative to the father, domestic violence/self-esteem, whether the wife (mother) needs permission from her husband to travel/freedom of mobility (Imai et al. 2014), decision making power and financial autonomy (Shroff et al. 2009), as well as access to health services and loans/self-efficacy (Kamiya et al. 2018). The variable nutritional status of children has been measured using various metrics, including stunting (Kamiya et al. 2018; Shroff et al. 2009), and underweight and wasting (Imai et al. 2014). Because these studies categorized the nutritional status of children, they use logistic regression analysis. Meanwhile, other studies use OLS and multinomial logit estimation methods because they use BMI in the form of z-score and underweight criterion (Patel et al. 2007). One of the reasons why maternal bargaining power has not significantly or negatively affected the nutritional status of children is the high matrilineal system in the study area compared to other areas that restrict mothers from traveling.
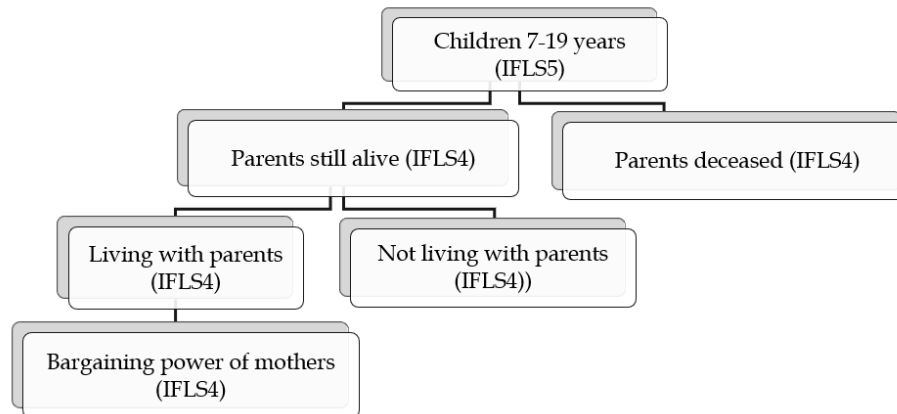
Findings from previous studies regarding the influence of maternal bargaining power on the nutritional status of children remain inconclusive; therefore, this study aims to further test the hypothesis already tested in the previous empirical studies. Bargaining power measurement in this study uses the same method as in the research conducted by Dasgupta (2016), Lépine & Strobl (2013), Patel et al. (2007), and Rajaram et al. (2017), while the measurement of nutritional status and estimation methods follow Dasgupta (2016), Kunto & Bras (2018), Lépine & Strobl (2013), and Patel et al. (2007), where most of them proved that maternal bargaining power had a positive effect on children's nutritional status. Therefore, the hypothesis in this study is that maternal bargaining power is positively related to the nutritional status of children, meaning that when the mother has high bargaining power by playing an active role in household decision making, the nutritional status of the child as measured by the HA z-score is also high.

3. Method

In this study the authors use secondary data—longitudinal data derived from IFLS waves 4 and 5 (2007 and 2014). IFLS contains questions or variables relevant to this study, such as health indicators to determine the nutritional status of children, information on maternal bargaining power, and other socio-demographic variables used as control variables to support this study. The unit of analysis in this study is children aged 7–19 years old in IFLS5 who in the IFLS4 period still had and lived with their parents. Their HA index in the form of a z-score was then used. Maternal bargaining power was observed in the IFLS4 period when the children were 0-12 years old. The assumption is that children aged 0-12 years are still under the full supervision of both parents, so that the bargaining power of the mother plays an important role in that age period.

The maternal bargaining power in this study is defined as how much role the mother plays in the effort to raise children with a good nutritional status through her decisions in the household. Of the 18 questions in IFLS, the authors chose 10 questions assumed to be related to the health (nutritional status) or needs of children in general. These questions are related to (see Appendix 1): (1) Expenditure for food eaten at home (A1); (2) Choosing the type of food eaten at home (A2); (3) Daily household expenses such as purchasing cleaning tools and the likes (B); (4) Expenditure for children's clothing (E); (5) Children's education (F); (6) Children's health (G); (7) Purchasing expensive household equipment such as refrigerator, TV, and so on (H); (8) Amount of money saved every month (M); (9) Is it the father/mother who works (P); and

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Figure 2. Unit of Research Analysis
Source: IFLS

(10) Does the father/mother use contraception (Q).

The questions were answered by only the respondent (father/mother), father and mother together, and other people including respondents with other household members. However, according to the assumptions based on the theoretical framework used in this study, parents are the only decision makers in the household. Therefore, only the decisions of the father and mother will be discussed. If the answers from each respondent (i.e., mother or father) to these questions are expressed in one measure with equal weighting, then the mother's bargaining power (θ) will be taken as $0 \leq \theta \leq 1$. 0 indicates that the mother's bargaining power is weak (i.e., no decisions are made by the mother), and 1 indicates that the mother's bargaining power is strong (i.e., all decisions are made by the mother).

In addition, based on the theoretical framework and previous research, other control variables were used in the form of parental characteristics such as work status; education, operationalized as years of schooling; height, to see the genetic factors from both parents; the father's bargaining power; child characteristics such as gender, age, and number of siblings; household characteristics such as household income and household asset ownership; and other environmental or EEP characteristics such as the number of *posyandu* in the village, classification of residence, and area (island). The price variable is not used because of the limited data used in this study.

To achieve the objectives of this study, the authors use an inferential analysis with the Ordinary Least Square (OLS) estimation method. The model generated from this method was used to describe the level of influence each independent variable has on the dependent variable through its parameter coefficient.

$$
\begin{aligned}
\text{haz\_child14} \quad = \quad & \beta_0 + \beta_1 \text{barg\_mom07} + \beta_2 \text{work\_mom07} + \beta_3 \text{educ\_mom07} + \beta_4 \text{height\_mom07} \\
& + \beta_5 \text{barg\_dad07} + \beta_6 \text{work\_dad07} + \beta_7 \text{educ\_dad07} + \beta_8 \text{height\_dad07} \\
& + \beta_9 \text{sex\_child14} + \beta_{10} \text{age\_child14} + \beta_{11} \text{sibling\_child07} + \beta_{12} \text{income\_hh07} \\
& + \beta_{13} \text{asset\_hh07} + \beta_{14} \text{posyandu07} + \beta_{15} \text{urban07} + \beta_{16} \text{java07} + \varepsilon_i \quad\quad (4)
\end{aligned}
$$

Table 1. Operational Definition of Variables in Research

Variable name	Operational definition	Symbol	Scale category	Data source
Dependent variable (Y)				
Nutritional status of children	HA z-score of children	haz_child14	numerical	us06, us04 IFLS5
Independent variable (X)				
Mother 's characteristics				
Bargaining power of mother	Proportion of maternal decisions in the household	barg_mom07	numerical	pk18 IFLS4
Working status	Mother's work status for the past week	work_mom07	1: working	ar15c IFLS4
		-	0: not working*	
Education	Mother's years of schooling	educ_mom07	numerical	ar16, ar17 IFLS4
Height	Mother's height (cm)	height_mom07	numerical	us04 IFLS4
Father's characteristics				
Bargaining power of father	Proportion of paternal decisions in the household	barg_dad07	numerical	pk18 IFLS4
Working status	Father's work status for the past week	work_dad07	1: working	ar15c IFLS4
		-	0: not working*	
Education	Father's years of schooling	educ_dad07	numerical	ar16, ar17 IFLS4
Height	Father's height (cm)	height_dad07	numerical	us04 IFLS4
Child characteristics				
Gender	The sex of the child	sex_child14	1: male	us01 IFLS5
		-	0: female*	
Age	Child age based on last birthday	age_child14	numerical	us03 IFLS5
Number of siblings	Number of siblings still living together	sibling_child07	numerical	bk_ar1 IFLS4
Household characteristics				
Household income	Household expenditure per month	income_hh07	numerical	b1_ks IFLS4
Ownership of household assets	Ownership of household assets in the form of a house, car, motorcycle, TV, refrigerator, etc.	asset_hh07	1: has	b2_hr1 IFLS4
		-	0: does not have*	
Environmental characteristics				
Number of *posyandu*	Number of *posyandu* in the village where the family lives	posyandu07	numerical	j26 IFLS4
Classification of residence	Urban-rural status of residence	urban07	1: urban	sc05 IFLS4
		-	0: rural*	
Classification of area (island)	Residence area based on island	java07	1: Java	sc01 IFLS4
		-	0: other than Java*	

Source: IFLS, compiled
Note: *) Reference category

4. Result

4.1. Descriptive analysis

The sample in the study is 2,044 children with 1,410 pairs of parents. The mean HA z-score of the 2,044 children was -1.378 with a standard deviation of 1.012 (see Table 2). The 1,410 pairs of parents were asked questions about their household decision making as the authors explained in the previous section. A comparison of the decision-making roles between the mother and father in the house-

hold showed that of the ten types of decisions, the mother was always dominant in all types of decisions, except for the decision to buy expensive household equipment and the decision regarding the employment status of the father/mother. However, there was quite a large difference between the decisions made by the mother and father regarding expenditure on food eaten, choosing the type of food eaten, and household daily expenses. This shows that the holder of responsibility related to daily needs was still in the hands of the mother,

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while those related to large expenses or other types of decisions the difference between the mother and father was not too significant. Moreover, related to expenses for buying expensive household equipment, the father was more dominant because the decision to work was more dominated by the father.

The results of the calculation of parental bargaining power showed that there were still quite a number of mothers (as many as 380 people/18.59 percent) who were not involved at all in making full household decisions (0 decisions). On the other hand, the mothers with the highest bargaining power (involved in 9 decisions) were only 4 people (0.20 percent), and the highest number was 0.3 (581 people/28.42 percent). The scatter plot of the children's HA z-score and the maternal bargaining power shows a flat pattern or no slope. This means that descriptively the HA z-score of children is not influenced by the high or low bargaining power of the mother.

4.2. Inferential Analysis

In this analysis, the authors use a robustness check model with three models. Model 1 contains independent variables in the form of individual characteristics (parents and children), household characteristics, and one EEP variable in the form of the number of *posyandu* in one village. This is done to examine the effect of maternal bargaining power on the nutritional status of children when it is regressed together with other independent variables at the individual, household, and environmental levels in a small scope (i.e., village). In Models 2 and 3, the environmental coverage (area) used is made wider, namely the classification based on urban-rural and classification based on Java and non-Java islands. This is done because descriptively the HA z-score of children living in urban areas or on the island of Java was relatively higher than that of children living in rural areas or outside the island of Java. Models 1 and 2 showed consistent significance for this variable of interest, namely maternal bargaining power. However, in Model 3, where the variable of residence area classification based on islands was

added, the bargaining power of mothers and the number of *posyandu* became insignificant. It can be concluded that the classification of residential areas based on islands can eliminate the influence of maternal bargaining power and the number of *posyandu* on the HA z-score of children in Indonesia. Therefore, the interpretation of the model in this inferential analysis focuses on Model 2.

The results of the overall test (F-test) show that there is sufficient evidence to reject H_0 because the value of Prob > F is smaller than $\alpha = 0.05$. Thus, it can be concluded that all the independent variables together are able to explain or influence the dependent variable in this study, namely the children's HA z-score. Meanwhile, the goodness of fit test, which can be seen from the R-squared value of 0.223, show that the independent variables explain 22.3 percent of the variance of the children's HA z-score. Of all the independent variables, there is no strong linear relationship among the independent variables, or commonly referred to as non-multicollinearity. This can be seen from the VIF value, no greater than 10 or tolerance (1/VIF) less than or equal to 0.01 (see Appendix 2).

The results of the partial test (t-test) show that the main independent variable in this study, namely maternal bargaining power, significantly and positively affected the nutritional status of the children as measured by the HA z-score ($\alpha = 0.10$). The parameter coefficient of 0.175 means that the children's HA z-score will increase by 0.175 standard deviation as the maternal bargaining power increases by one unit, or the HA z-score of children in 2014 would have increased by 0.0175 standard deviation if the level of participation of mothers in household decisions in 2007 had increased by one decision, assuming other variables were ceteris paribus. The results of this study are in accordance with the hypothesis and several previous studies (Dasgupta 2016; Debnath & Bhattacharjee 2016; Kunto & Bras 2018; Lépine & Strobl 2013; Rajaram et al. 2017; Sinha et al. 2017). There are several reasons that explain the results of this study. First, mothers are the primary caregivers of their children, and the
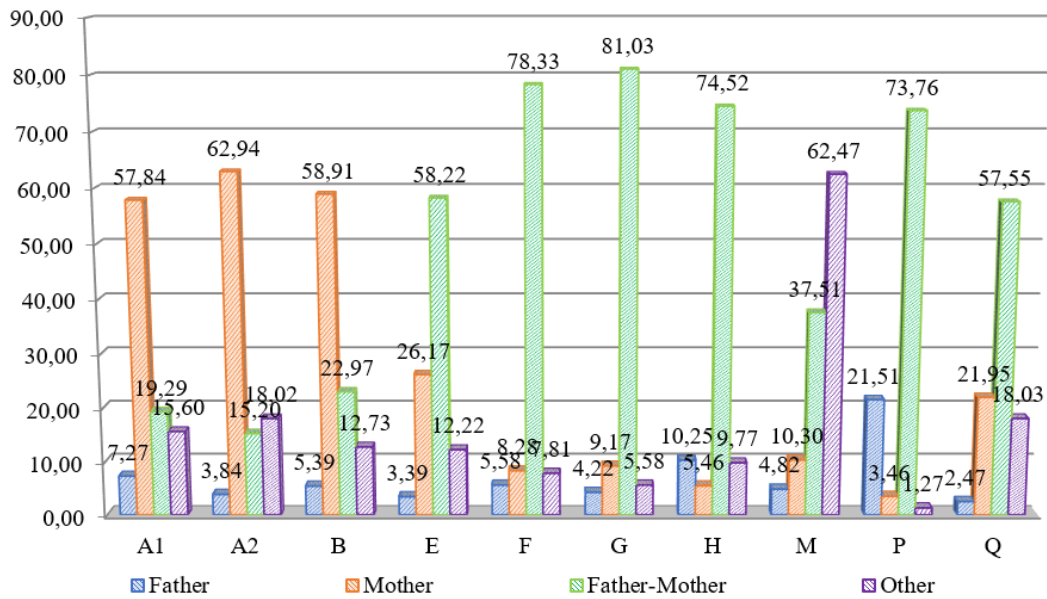
Figure 3. Types of Household Decisions by Decision Maker (percent)
Source: IFLS, compiled
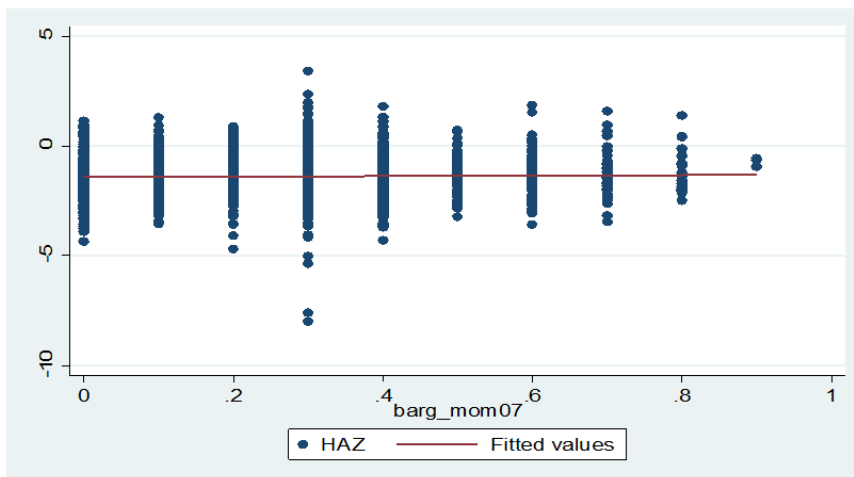
Figure 4. Scatter Plot Between Child's Z-score HA and Maternal Bargaining Power
Source: IFLS, compiled

quality of care for children is one of the three main determinants of their nutritional status, in addition to household food security and healthy environment. Second, maternal bargaining power has an indirect effect because it can affect the health and nutritional status of the mother herself, both of which are central to proper care for children from pregnancy to delivery (Smith et al. 2003). Third, mothers and fathers appear to have differences in allocating income. Fa-

thers tend to use a larger proportion of their income for production, household maintenance, social investment, and personal consumption, while mothers use more of the income to meet daily consumption, such as food, clothing, and health care (Lele 1986). Other studies have also shown that fathers and mothers have different preferences in allocating resources; for mothers managing resources is more important than just the number of resources

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Table 2. Summary of research variable statistics

Variable	Average	Std. Deviation	Min	Max
haz_child14	-1,378	1,012	-8	3,42
barg_mom07	0,279	0,196	0	0,9
work_mom07	0,441	0,497	0	1
educ_mom07	6,77	4,513	0	16
height_mom07	150,958	5,099	127,2	171,2
barg_dad07	0,071	0,127	0	0,8
work_dad07	0,943	0,231	0	1
educ_dad07	7,394	4,677	0	18
height_dad07	161,291	10,436	156	182
sex_child14	0,493	0,5	0	1
age_child14	12,574	3,302	7	18
sibling_child07	1,622	1,339	0	9
income_hh07	3.788.867	1.284.591	206.041	20.583.790
asset_hh07	0,592	0,492	0	1
posyandu07	7,285	5,317	0	46
urban07	0,494	0,5	0	1
java07	0,642	0,48	0	1

Source: IFLS, compiled

(Vijaya, Lahoti & Swaminathan 2014). Compared to their partners, mothers are more likely to spend the family resources on nutrition, education, and health-related commodities (Fantahun et al. 2007; Quisumbing & Maluccio 2003; Thomas 1990).

Other parental characteristics, namely the father's bargaining power and the mother's work status were not found to be statistically significant in influencing the HA z-score of the children. However, the father's work status showed the opposite in that it significantly and positively affected the HA z-score of the children ($\alpha = 0.01$). The parameter coefficient was 0.209, which means that the difference in the HA z-score between children with working fathers and non-working fathers was quite large, 0.209 standard deviation. The education variable of both parents operationalized as years of schooling was found to significantly and positively influence the HA z-score of the children ($\alpha = 0.05$ for mothers and $\alpha = 0.01$ for fathers). The parameter coefficient of maternal education is slightly lower than that of the father (0.012 vs. 0.016), which means that one additional year of parental education (i.e., mother and father) will have a positive effect on increasing the HA z-score of children by 0.012 and 0.016 standard deviation, respectively. A likely explanation is that paternal work status and parental education will increase the opportunity to provide better nu-

trition for the children, prevent diseases, or meet other needs related to the children's health, as well as broaden parents' knowledge about child development. From the genetic factors operationalized as the height of the parents, the results were similar. Both the height of the mother and father positively and significantly influenced the HA z-score of the chilren with parameter coefficients of 0.060 and 0.017, respectively ($\alpha = 0.01$). This means that each additional 1 cm height of the mother and father will increase the HA z-score of the children by 0.060 and 0.017 standard deviation, respectively. From these results, it can also be seen that the genetic influence of the mother, operationalized as the mother's height, is more dominant in influencing the HA z-score of the children compared to the genetic influence of the father, operationalized as the father's height.

All the variables related to the child characteristics were significant in explaining the variance of the children's HA z-score, both sex ($\alpha = 0.05$), and age and number of siblings ($\alpha = 0.01$). The parameter coefficient for the gender variable was 0.086, meaning that the difference in the HA z-score between boys and girls was 0.086 or in other words, the nutritional status of boys was better than that of girls. Conversely, the parameter coefficient for the variable age of the child showed the opposite; it had

Table 3. Comparison of Regression Models Based on the Number of Independent Variables

Independent Variable	Model 1 haz_child14	Model 2 haz_child14	Model 3 haz_child14
konstanta	-13,640***	-13,600***	-13,730***
	(0,663)	(0,659)	(0,660)
barg_mom07	0,178*	0,175*	0,151
	(0,102)	(0,102)	(0,102)
work_mom07	-0,042	-0,03	-0,028
	(0,041)	(0,041)	(0,041)
educ_mom07	0,015***	0,012**	0,011**
	(0,006)	(0,006)	(0,006)
height_mom07	0,060***	0,060***	0,060***
	(0,004)	(0,004)	(0,004)
barg_dad07	-0,118	-0,081	-0,141
	(0,160)	(0,159)	(0,160)
work_dad07	0,176**	0,209**	0,224***
	(0,087)	(0,086)	(0,086)
educ_dad07	0,019***	0,016***	0,016***
	(0,005)	(0,005)	(0,005)
height_dad07	0,018***	0,017***	0,017***
	(0,002)	(0,002)	(0,002)
sex_child14	0,083**	0,086**	0,085**
	(0,040)	(0,040)	(0,040)
age_child14	-0,016**	-0,016***	-0,016**
	(0,006)	(0,006)	(0,006)
sibling_child07	-0,042**	-0,054***	-0,048***
	(0,018)	(0,018)	(0,018)
income_hh07	3,40 x10-7**	3,31x10-7**	3,54x10-7**
	(1,57x10-7)	(1,56x10-7)	(1,56x10-7)
asset_hh07	0,167***	0,168***	0,149***
	(0,041)	(0,041)	(0,041)
posyandu07	0,014***	0,008*	0,005
	(0,004)	(0,004)	(0,004)
urban07		0,211***	0,213***
		(0,045)	(0,045)
java07			0,121***
			(0,044)
N	2.044	2.044	2.044
R-sq	0,214	0,223	0,225

Source: Authors' estimation
Note: *** significant at $\alpha = 0.01$; ** significant at $\alpha = 0.05$; and * is significant at $\alpha = 0.10$

a negative effect on the HA z-score of the children with a value of -0.016. This means that a one-year increase in the age of the child is followed by a decrease of 0.016 standard deviation in the children's HA z-score. This is because child development is very much determined during childhood, where the growth in that period is very fast. On the other hand, there are also many cases of malnutrition during this age period so that as children age, their HA z-score will likely decrease. Likewise, the number of siblings was found to have a negative effect on the HA z-score of children with a parameter coefficient of -0.054. This means that each additional

sibling can reduce the child's nutritional status by decreasing the HA z-score by 0.054 standard deviation. This is in line with the economic theory related to the quantity and quality of children, whereby parents are faced with a choice (trade off) to maximize their utility and to prioritize either quantity or quality of children, which includes children's nutritional status (Becker & Lewis 1973).

The results pertaining to household characteristics showed that both income and asset ownership had a positive and significant effect on the HA z-score of children ($\alpha = 0.05$ for income and $\alpha = 0.01$ for asset ownership). The parameter coefficient for each variable was 3.31 x 10-7 for income and 0.168 for asset ownership. This means that the HA z-score of children will increase by 0.0331 standard deviation when the household income increases by IDR 100,000 per month. Children who live in households with assets will have a HA z-score of 0.168 standard deviation higher than children who live in households without assets. This seems reasonable because high income and ownership of household assets will facilitate the provision of better nutrition and other needs related to children's health as well as prevention or cure of diseases.

Regarding the environmental characteristics, the number of *posyandu* in one village and the classification of residence (urban-rural) both showed the same results in influencing the HA z-score of children, which was positive and significant ($\alpha = 0.01$ for urban-rural status and $\alpha = 0.10$ for the number of *posyandu*). The parameter coefficient for urban-rural status was 0.211 and the number of *posyandu* was 0.008. This means that the difference in the HA z-score of children living in urban areas is 0.211 standard deviation better than children living in rural areas. This is perhaps due to better health infrastructure and facilities in urban areas so that meeting children's good nutritional needs and preventing diseases are much easier than in rural areas. As for the number of *posyandu*, when the number of *posyandu* increases by 1 unit in one village, the HA z-score of children will increase by 0.008 standard deviation. *Posyandu* is a com-

munity center that offers periodic health services. It tracks the status of children's growth and development, conducts an initial screening to prevent growth disorders, and provides guidance to mothers regarding the nutritional intake for the children. Therefore, the existence of *posyandu* is important in supporting the improvement of the nutritional status of children in Indonesia. This of course also depends on the awareness and active role of the mothers themselves to take their children to the *posyandu*.

5. Conclusion

Of the ten types of household decisions included in the study, mothers have been found to be more dominant in making household decisions than fathers. However, when viewed as a whole from the bargaining power of mothers in the household, there were still quite a number of mothers (380 people/18.59 percent) who were not involved at all in making full household decisions (0 decisions). Based on the inferential analysis, it can be concluded that the bargaining power of the mother has a positive impact on the nutritional status of children as measured by HA z-score. However, the other independent variables provide mixed results. For example, the father's bargaining power and the mother's work status were found to be not statistically significant in affecting the nutritional status of children. The characteristics of children in terms of age and number of siblings are variables that have a negative impact on children's nutritional status. On the other hand, the variables of the father's work status, education and height of parents, and household income have a positive impact on children's nutritional status. Furthermore, seen from the dummy variable, it can be concluded that boys living in a household that has assets and living in urban areas will have a better nutritional status than girls living in a household that has no assets and living in the countryside.

Extra attention is needed to increase the bargaining power of mothers in the household, for example by providing mothers with the opportunity to participate more in the household, not only in food-related matters or daily expenses, but also giving them more control of household resources/income, high respect in the household, space to express their opinions, and others in an effort to improve the quality of the children, specifically the nutritional status of children. In addition, the bargaining power of mothers in the household can increase as their knowledge increases. Therefore, the mother's socialization process with the surrounding community, neighbors, or friends can be very important because with socialization, mothers can exchange ideas about household matters. Future research should also investigate the role of mothers in influencing other aspects related to children's quality, for example education, cognitive development, future employment opportunities, or household welfare in general. The limitation of this study concerns the use of data with a long time interval between survey periods (i.e., 7 years). This means that this study cannot capture what happened during the 7-year interval. Therefore, further research is expected to use survey data with a shorter time interval to produce more reliable results. However, the authors believe that the results of this study can enrich the literature on bargaining power of mothers through their decisions in the household as an effort to improve the quality of children's nutritional status.

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Appendices

Appendix 1. IFLS Questionnaire on Bargaining Power

SEKSI PK (PENGAMBILAN KEPUTUSAN DALAM RUMAH TANGGA)
Sekarang kami ingin mengetahui bagaimana rumah tangga ini membuat suatu keputusan tentang pengeluaran dan alokasi waktu.

PENGELUARAN DAN ALOKASI WAKTU (PK2TYPE)	PK18. Didalam keluarga ini, siapa saja yang membuat keputusan tentang [...] (JAWABAN BOLEH LEBIH DARI SATU)																	
	RESPONDEN	SUAMI/ISTRI	ANAK LAKI-LAKI	ANAK PEREMPUAN	IBU	AYAH	IBU MERTUA	AYAH MERTUA	SAUDARA KANDUNG LAKI-LAKI	SAUDARA KANDUNG PEREMPUAN	IPAR LAKI-LAKI	IPAR PEREMPUAN	KAKEK/NENEK	MENANTU	CUCU	LAINNYA	X ATAU W ATAU Y	TDK MENJAWAB
A1. Pengeluaran untuk makanan yang dimakan dirumah	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
A2. Memilih jenis makanan yang dimakan dirumah	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
B. Pengeluaran rumah tangga sehari-harinya, seperti pembelian alat-alat kebersihan rumah tangga dan sejenisnya	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
C. Pengeluaran Untuk pakaian Ibu/Bapak/Sdr sendiri	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
D. Pengeluaran untuk pakaian suami/istri	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
E. Pengeluaran untuk pakaian anak-anak	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	W	Z
F. Pendidikan anak-anak	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	W	Z
G. Kesehatan anak-anak	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	W	Z
H. Pembelian perlengkapan rumah tangga yang mahal (seperti kulkas, TV dsb)	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
I. Memberikan uang kepada orang tua atau keluarga Ibu/Bapak	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	X	Z
J. Memberikan uang kepada mertua atau keluarga suami/istri	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	X	Z
K. Memberikan hadiah/bantuan pada orang lain (hadiah perkawinan/pesta)	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
L. Jumlah uang untuk arisan per bulan	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	X	Z
M. Jumlah uang yang ditabung setiap bulan	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	X	Z
N. Jumlah waktu suami yang dihabiskan diluar rumah untuk bersosialisasi bersama teman/tetangga	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
O. Jumlah waktu istri yang dihabiskan diluar rumah untuk bersosialisasi bersama teman/tetangga	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
P. Apakah Ibu/Bapak yang bekerja atau suami/istri yang bekerja ? CATATAN PEWAWANCARA: TANYAKAN SIAPA YANG BEKERJA , RESP. ATAU SUAMI/ISTRI?	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V		Z
Q. Apakah Ibu/Bapak atau suami/istri menggunakan kontrasepsi? CATATAN PEWAWANCARA: TANYAKAN SIAPA YANG MENGGUNAKAN KONTRASEPSI?	A	B	C	D	E	F	G	H	I	J	K	L	M	O	P	V	Y	Z

Kode PK18: X. Tidak pernah menggunakan uang untuk keperluan ini. Y. Tidak pernah menggunakan kontrasepsi.   W. Tidak punya anak   V. LAINNYA   Z. TDK MENJAWAB

Appendix 2. Model 2 Regression Results

```
. eststo: reg haz_child14 barg_mom07 work_mom07 educ_mom07 height_mom07 barg_dad07
    work_dad07 educ_dad07 height_dad07 sex_child14 age_child14 sibling_child07 income_hh07
    asset_hh07 posyandu07 urban07
```

Source	SS	df	MS		Number of obs	=	2,044
					F(15, 2028)	=	38.72
Model	465.377791	15	31.0251861		Prob > F	=	0.0000
Residual	1625.13202	2,028	.80134715		R-squared	=	0.2226
					Adj R-squared	=	0.2169
Total	2090.50981	2,043	1.02325492		Root MSE	=	.89518

haz_child14	Coef.	Std. Err.	t	P>|t|	[95\% Conf.	Interval]
barg_mom07	.1752699	.1018886	1.72	0.086	-.0245474	.3750872
work_mom07	-.0300806	.0411691	-0.73	0.465	-.1108187	.0506574
educ_mom07	.0116552	.0055492	2.10	0.036	.0007726	.0225378
height_mom07	.0597839	.0039634	15.08	0.000	.0520111	.0675567
barg_dad07	-.0811804	.1592081	-0.51	0.610	-.3934088	.2310481
work_dad07	.2086415	.0864074	2.41	0.016	.0391851	.3780979
educ_dad07	.0156043	.0053038	2.94	0.003	.0052028	.0260059
height_dad07	.0170306	.0019293	8.83	0.000	.013247	.0208142
sex_child14	.0864855	.0397856	2.17	0.030	.0084606	.1645104
age_child14	-.0165337	.0061332	-2.70	0.007	-.0285618	-.0045057
sibling_child07	-.0534888	.0175465	-3.05	0.002	-.0878999	-.0190776
income_hh07	3.31e-07	1.56e-07	2.12	0.034	2.49e-08	6.36e-07
asset_hh07	.1680549	.0410729	4.09	0.000	.0875055	.2486043
posyandu07	.0077451	.0040337	1.92	0.055	-.0001655	.0156557
urban07	.2114543	.0446875	4.73	0.000	.1238161	.2990925
_cons	-13.5982	.6591711	-20.63	0.000	-14.89093	-12.30548

```
(est2 stored)
```

Model 2 non-multicollinearity test

```
. vif
        Variable |      VIF       1/VIF
----------------+----------------------
      educ_mom07 |     1.60     0.625539
      educ_dad07 |     1.57     0.637455
         urban07 |     1.27     0.785395
      posyandu07 |     1.17     0.852676
      work_mom07 |     1.07     0.938402
     age_child14 |     1.05     0.956251
 sibling_child07 |     1.04     0.957264
     height_mom07 |    1.04     0.960206
       asset_hh07 |    1.04     0.962145
        barg_dad07 |   1.04     0.965169
    height_dad07 |     1.03     0.967598
      income_hh07 |    1.02     0.978087
        work_dad07 |   1.02     0.980923
        barg_mom07 |   1.02     0.983384
       sex_child14 |   1.01     0.990927
----------------+----------------------
        Mean VIF |     1.13
```